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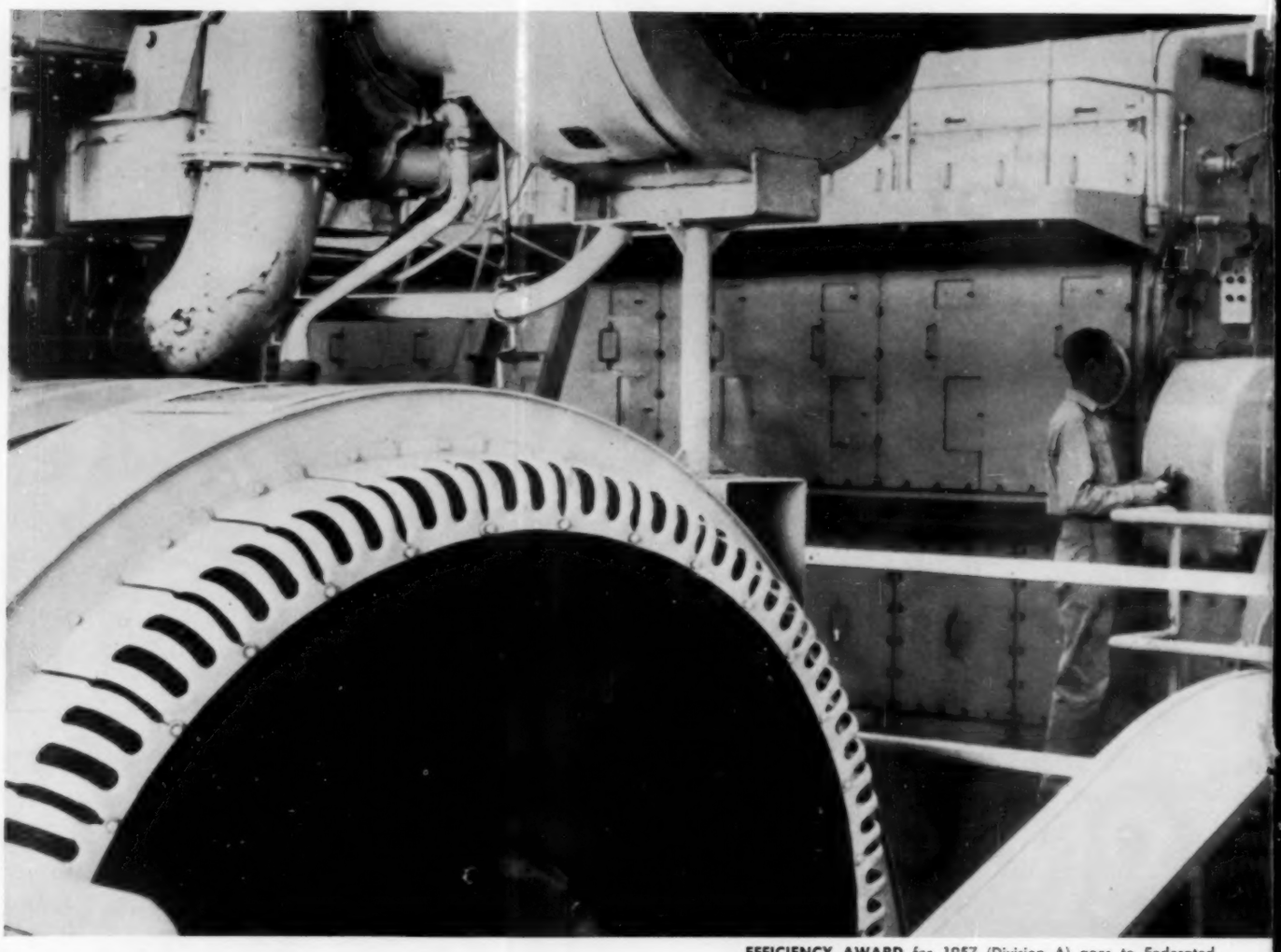
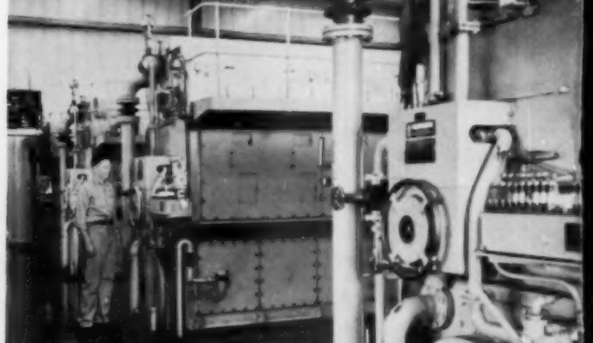


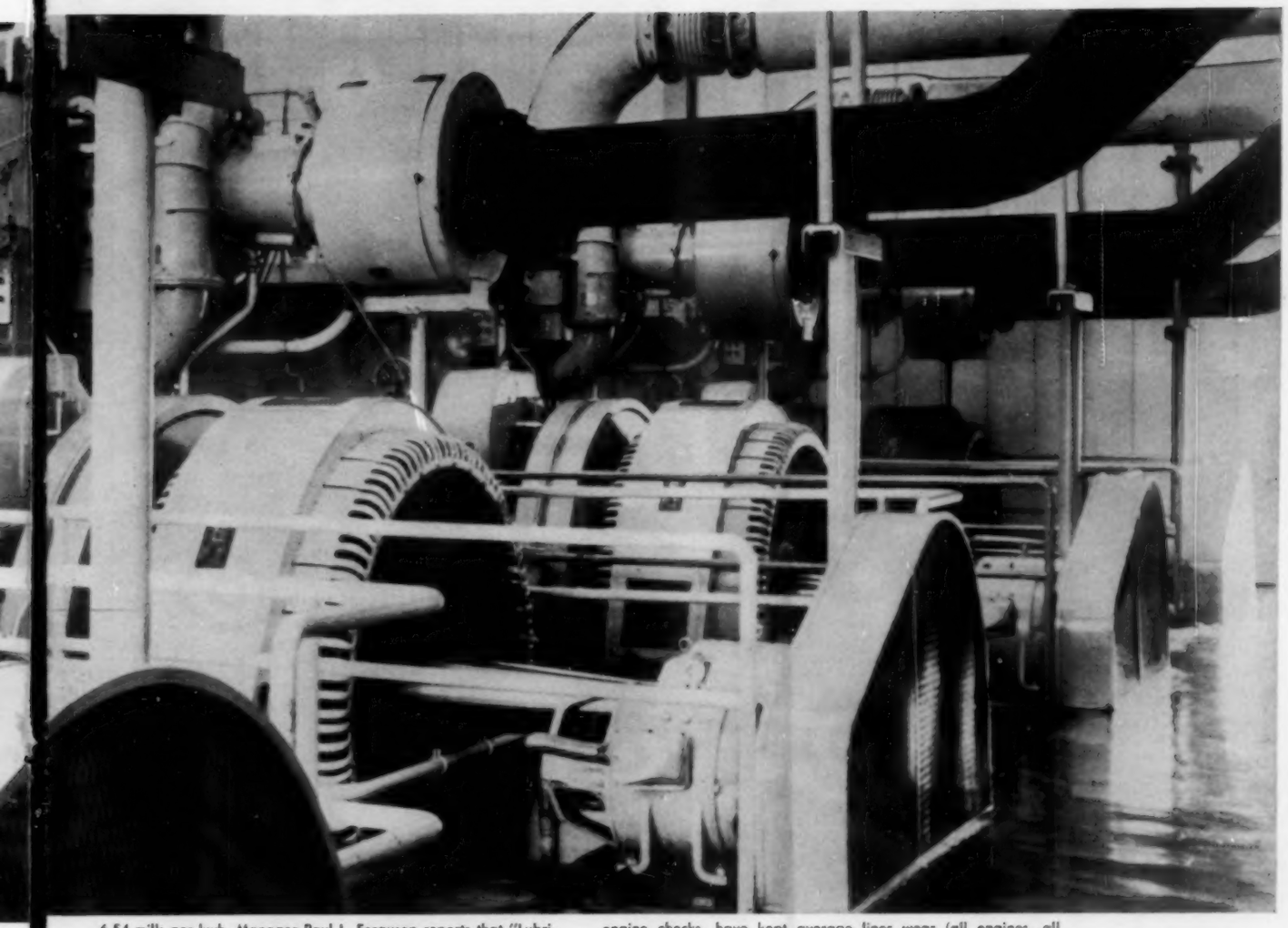
EFFICIENCY AWARD for 1957 (Division A) goes to Federated Rural Electric Assn. for producing power at the low cost of only

"MOST EFFICIENT" REA

A GOOD NEIGHBOR as well as an efficient one, Federated's modern plant is handsomely landscaped, and the engines exhaust into Maxim silencers.



POWERFUL PERFORMERS stay powerful with Texaco Lubrication. Each 8-cylinder 4-cycle Nordberg Duafuel engine is rated at 1750 hp at 327 rpm.



6.54 mills per kwh. Manager Paul L. Ferguson reports that "Lubrication with Texaco Ursa Oil Heavy Duty, and frequent thorough engine checks, have kept average liner wear (all engines, all cylinders) down to 0.005" after 33,000 hours operation."

plant wins title with Texaco

A combination of rigid maintenance standards and the use of Texaco Ursa Oil Heavy Duty has won two *Diesel Progress* awards for efficiency for Federated Rural Electric Association, Jackson, Minn. In 1954, and again for 1957, Federated was named "the most efficiently operated of all REA internal combustion plants." This is how Texaco has helped Federated stay on top:

Texaco Ursa Oil Heavy Duty keeps engines clean, for maximum efficiency. It prevents formation of sludge, keeps the rings free and compression high, so the engine uses less fuel, and runs longer between scheduled overhauls.

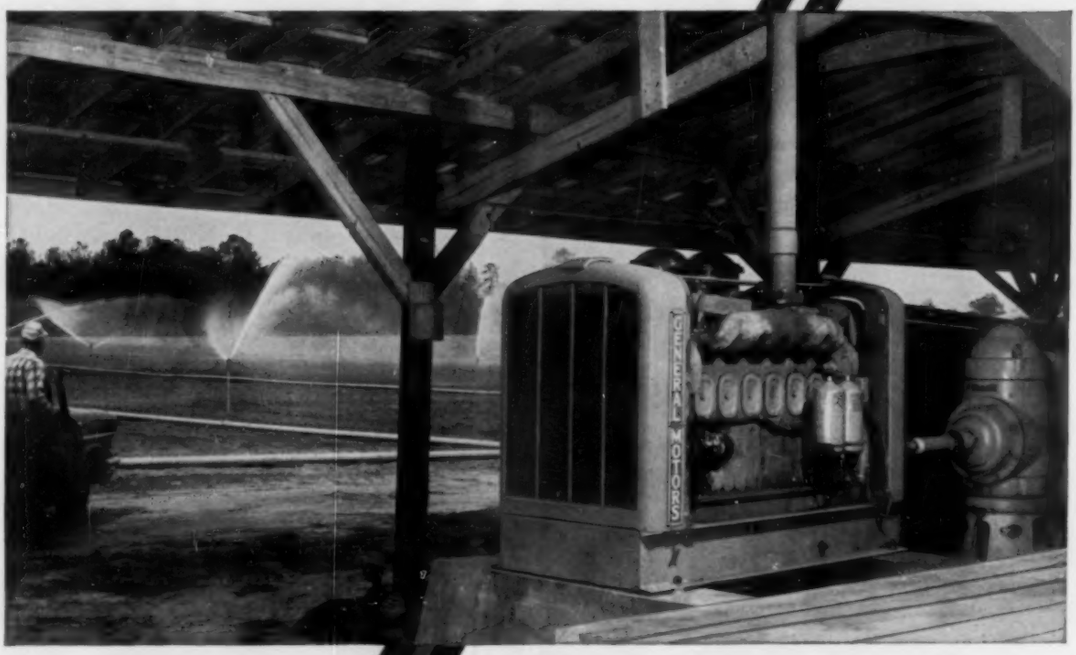
Minimizes wear, too. Texaco Ursa Oil Heavy Duty is a premium quality lubricant, one of the complete line of Texaco Ursa Oils especially refined and processed to lubricate diesel, gas and dual-fuel engines. For details on what Texaco Ursa Oils can do in your plant, call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)

Drought bites the dust!



Temperatures made to order for all types of diesel engines. Harrison heat exchangers are rugged, reliable and compact . . . engineered to provide the optimum in cooling efficiency.

Harrison-Cooled GM Diesel Saves Crops From Two-Month Dry Spell!

Harrison helps rout the drought! This GM Diesel worked continuously for 60 days and nights operating an irrigation system to save crops during an extreme dry spell. And Harrison coolers kept engine oil temperatures under control. You can depend on Harrison heat exchangers for all kinds of rugged action and long endurance. That's because they're backed by the research and experience of Harrison's 47 years in making top-quality heat-control products. If you have a cooling problem, look to Harrison for the answer.

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DIESEL PROGRESS for July, 1958, Vol. XXIV, No. 7. Published Monthly by Diesel Engines, Inc., 816 N. La Cienega Blvd., Los Angeles 46, California. Phone OLeander 5-7410. Subscription rates are $5.00 for U.S.A. and possessions. All other countries $7.50 per year. Subscriptions may be paid the London office at £2-12s-6d per year. Accepted as Controlled Circulation Publication at Long Prairie, Minnesota.

DIESEL PROGRESS is indexed regularly by Engineering Index, Inc. and is available in microfilm editions from University Microfilms, Inc., Ann Arbor, Michigan.

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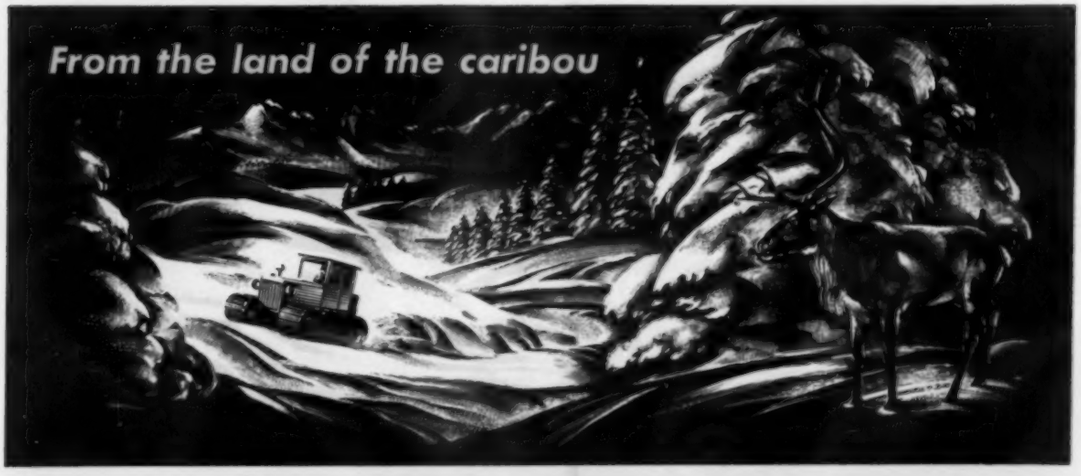
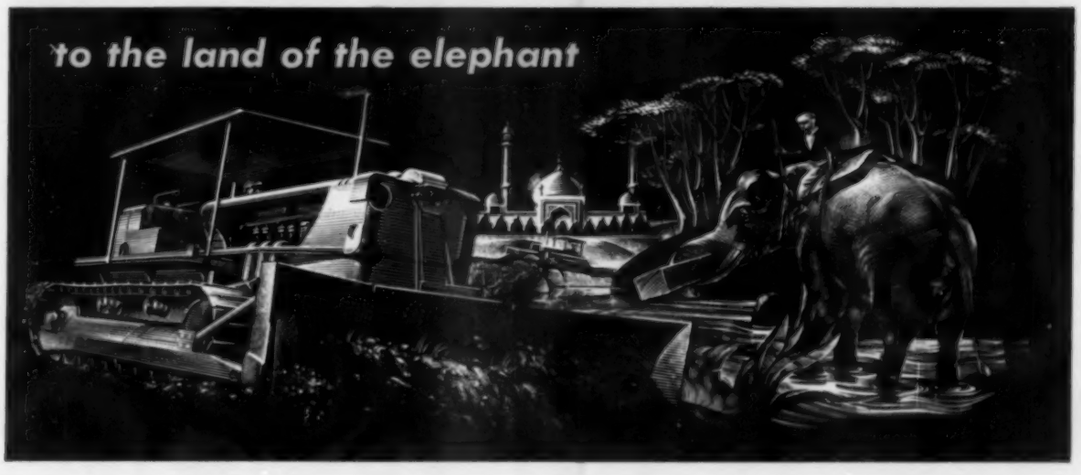
One of two International 75 Payscrapers being used to move 500,000 cu yds of borrow material for the fill for the new plant site of Ogden Sewage Plant 10 miles west of Ogden, Utah.





Other Outstanding Shell Industrial Lubricants

Shell Tellus Oils—for closed hydraulic systems

Shell Talona R Oil 40—anti-wear crankcase oil for diesel locomotives

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Shell Macoma Oils—for extreme pressure industrial gear lubrication

Shell Voluta Oils—for high-speed quenching with maximum stability

Its performance and name are the same around the world

Shell Rimula Oil is a heavy-duty oil designed to solve the toughest lubricating problems in diesel engines.

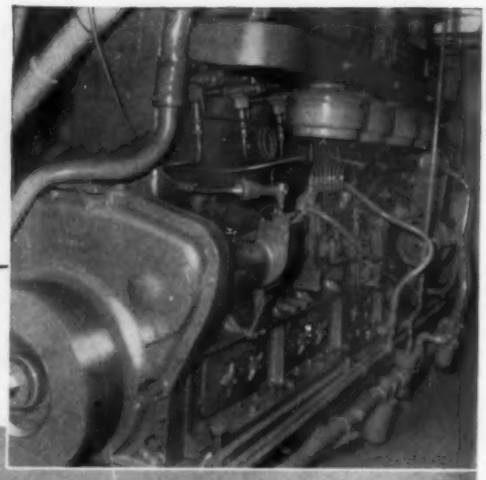
One of these problems—excessive cylinder and ring wear—results from acidic combustion products. It occurs under all operating conditions, but is especially severe under low jacket temperatures. Rimula® Oil contains an alkaline additive that counteracts this acid wear. It remains stable under the widest temperature extremes encountered in modern operation. It keeps engine parts clean and operating efficiently over longer periods . . . effecting worthwhile savings in labor and parts.

Rimula Oil is available to your customers abroad. They can depend upon it for the most severe conditions of diesel operation. For full information, write: Shell Oil Company, 50 West 50th Street, New York 20, New York, or 100 Bush Street, San Francisco 6, California.

SHELL RIMULA OIL

SHELL

Here's DO-MORE POWER at work



The Allis-Chalmers DCMR2505 diesels in the KATE ran four years — 28,000 hours — without repair. Twin Allis-Chalmers 844's on the CARLTON, another boat in the Roue fleet, have operated three years and "have never had a wrench on them."

4 YEARS (28,000 HOURS) WITHOUT AN OVERHAUL

...record of the Allis-Chalmers diesels on the KATE,

Capt. Volcar "Roue" Cheramie

BM-26

says Captain Volcar "Roue" Cheramie, president of the Roue Towing Company, Galiano, Louisiana—

"And that's why I operate a total of 18 Allis-Chalmers diesels in my inland and offshore towing fleet."

"When it comes to jobs such as barging petroleum products, or moving marine drilling rigs, you can't beat the dependability of Allis-Chalmers diesels," continued Capt. Cheramie. "All of my boats — the KATE, LADY NICA, SHEILA C, ROUE and CARLTON — have both Allis-Chalmers propulsion and auxiliary power."

See your Allis-Chalmers dealer about this kind of dependable DO-MORE power for *your* boats, Allis-Chalmers, Milwaukee 1, Wis.

ALLIS-CHALMERS

THIS MUCH DIRT CAN RUIN A DIESEL ENGINE

THIS PUROLATOR FILTER

STOPPED THIS MUCH DIRT

Diesels can't escape abrasive dirt . . . and it takes about 8 ounces of it to ruin an engine.

The 18 pounds of dirt shown above were stopped by a Purolator heavy duty dry type air filter on a rock drilling rig in 940 hours of operation—with no servicing of the filter required. The 6 cylinder, 2 cycle engine and the 750 CFM compressor used on the job were fully protected through the toughest operating conditions. 18 pounds of dirt were stopped . . . none got through the filter.

There's a Purolator dry type air filter designed to meet the specific requirements of your operation. Write today for full information. If you have a particularly tough problem, describe it . . . Purolator has the solution.

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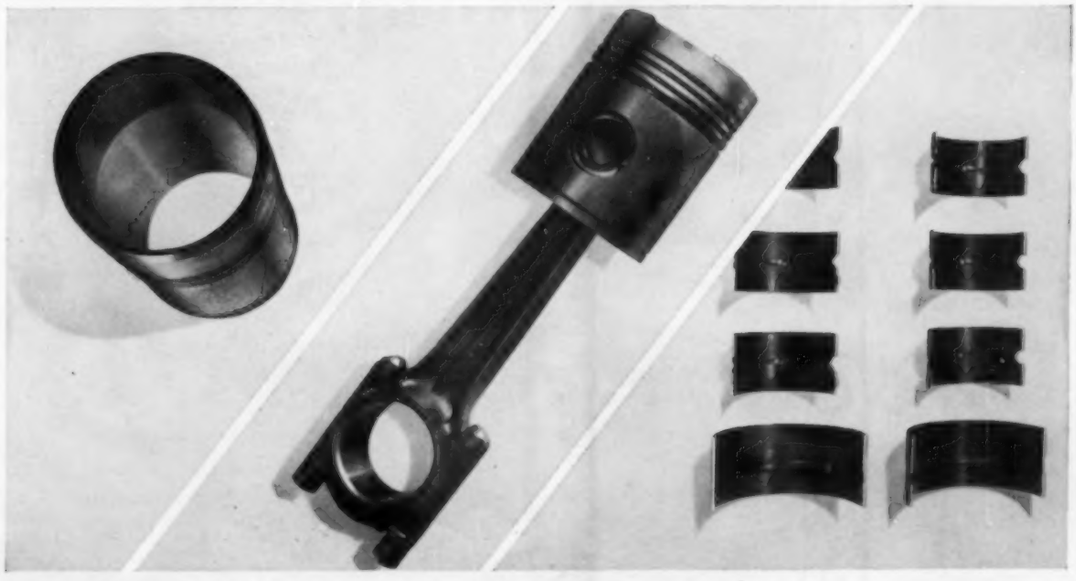
The Engineer's Field Report

CASE HISTORY
LUBRICANT RPM Delo Oils
FIRM Progressive Transportation Co, Compton, California

RPM DELO holds piston wear to .001" after 201,253 miles of on-and-off highway hauling



LUBRICATED WITH RPM DELO Oil, these engine parts were pulled from a Cummins HR diesel after 201,253 miles. A portion of this mileage was put on during four months of rugged service spotting loads of heavy pipe in the Arizona desert. When the engine was taken down, after two years of this on- and off-highway hauling, Progressive Transportation Co. found RPM DELO Oil had kept lacquer, gum, sludge, and deposits from forming...rod bearing wear varied between .0005 and .001 inch and pistons showed maximum wear of only .001". No wear at all evident on main bearings. Progressive Transportation uses RPM DELO Oils in all its large fleet of tractors—some of which have traveled well over 200,000 miles without overhaul.

Why RPM DELO Oils prolong engine life

Special compounds stop corrosion

Anti-oxidant resists lacquer formation

Detergent keeps all parts clean

Metal-adhesion qualities keep oil on parts in running or idle engines—inhibitor resists foaming

LUBRICATING OILS RPM DELO

For More Information... about this or other petroleum products of any kind, or the name of your nearest distributor, write or call any of the companies below.

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THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey • **THE CALIFORNIA COMPANY**, Denver 1, Colorado

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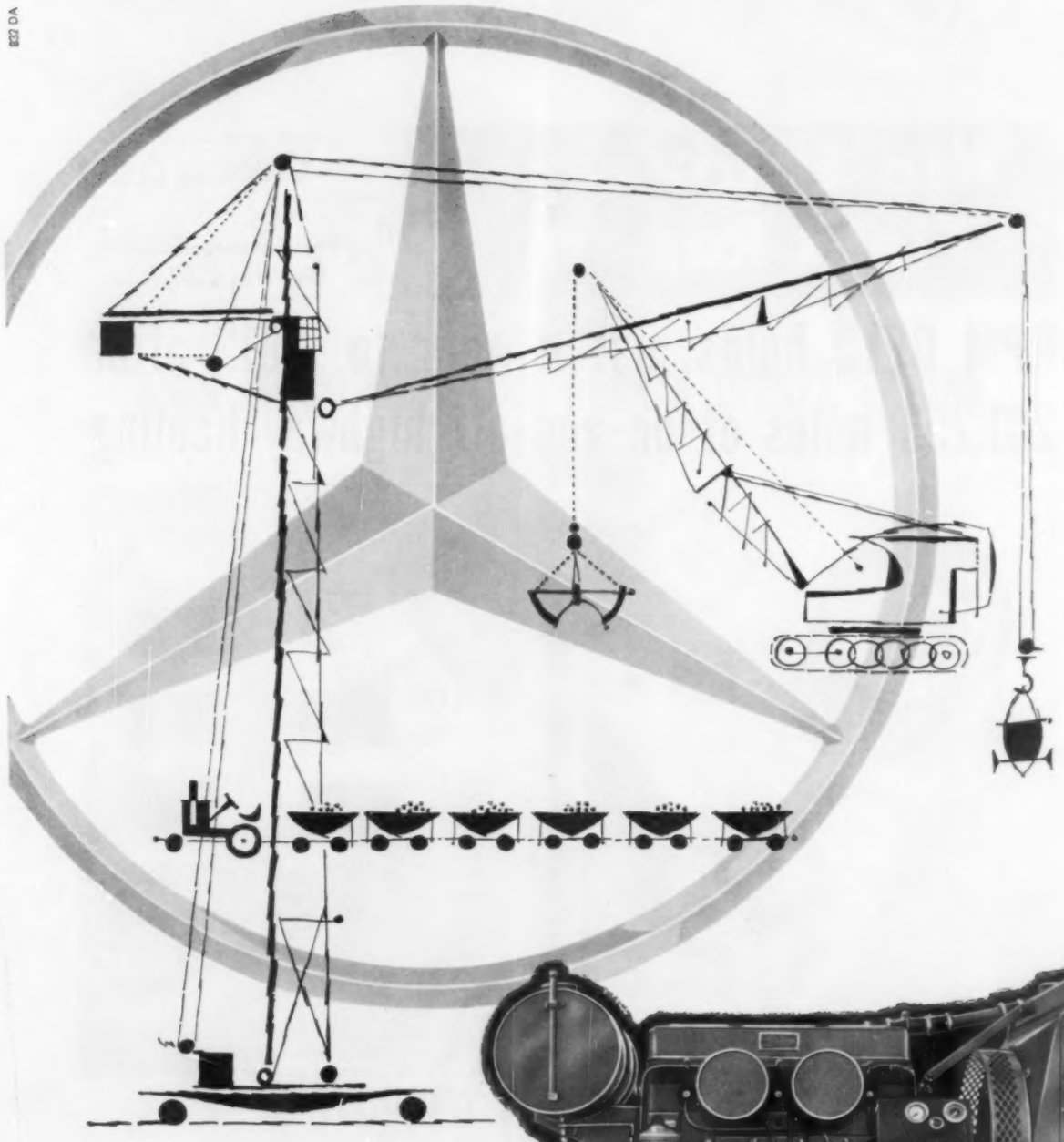

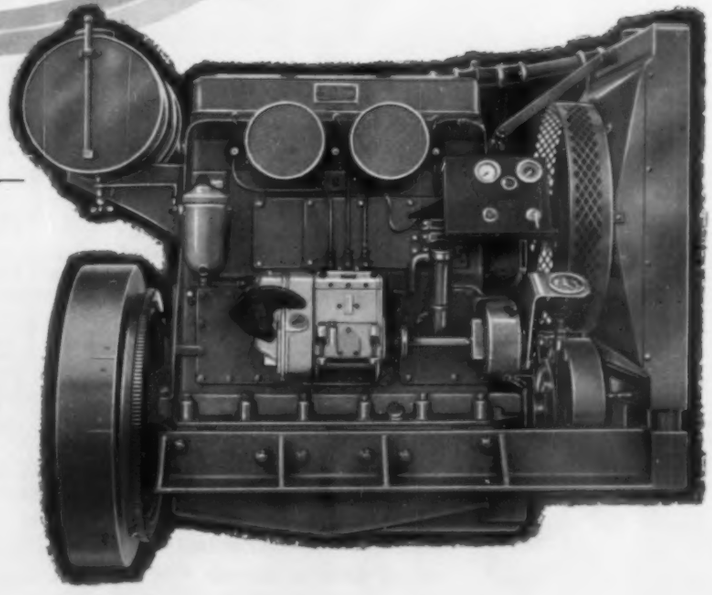

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has been building sturdy diesel engines for every
purpose in the construction field. Excavators,
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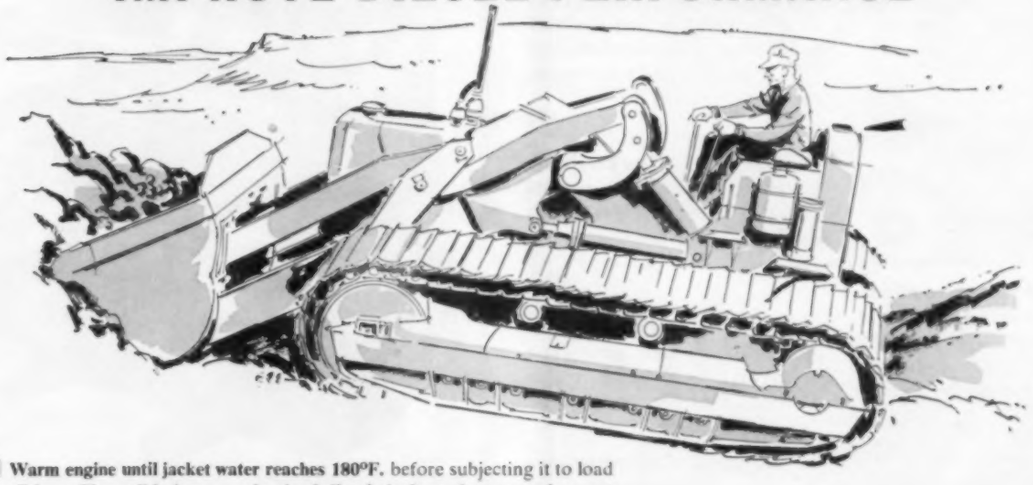
DIESEL FUEL and LUBRICATION

BULLETIN

CITIES SERVICE

HERE'S HOW YOU CAN REDUCE SLUDGE, IMPROVE DIESEL PERFORMANCE



1 **Warm engine until jacket water reaches 180°F.** before subjecting it to load conditions. If possible keep mechanized diesels in heated garage when not in use.

2 **Protect crankcase pans of mobile units** with shutters or similar devices that will insulate against icy winter blasts.

3 **Be sure fuel injection system is working properly.** If the fuel injection system permits raw fuel to reach the cylinder walls, it will impair operation by diluting with the oil and helping soot to reach the crankcase.

4 **Avoid sooty fuel.** Remember that a diesel engine normally produces five to eight times more soot than a gasolene engine. A dirty fuel—a fuel that produces black exhaust, will greatly increase this amount of soot.

5 **Choose your lubricating oil carefully.** Diesel engines produce more combustion impurities than gasolene engines. Consequently, it is imperative to use oil made from high-quality base stocks, with a sufficiently high additive level to protect engine parts. **For most high-speed mechanized diesels, Cities Service C-300 Motor Oil perfectly fills these requirements.** Cities Service C-300 is made from the finest base oils, strongly fortified against oxidation and corrosion. Its excellent detergent-dispersant qualities help keep insolubles in suspension, prevent engine damage. Many diesel operators credit Cities Service C-300 for doubling and tripling periods between overhaul.

6 **When in doubt, consult a Cities Service Lubrication Engineer.** Years of specializing in lubrication problems and recommendations enable your Cities Service Lubrication Engineer to give worthwhile advice and assistance for your operation. One of these men will gladly survey your lubrication needs at no cost or obligation. Contact your nearest Cities Service office or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

MAN YOU SHOULD KNOW

Lubrication Engineer C. J. Smith of the Cities Service office in Kansas City typifies the experienced specialists who can help you solve your lubrication problems. Wherever your plant is located—anywhere east of the Rockies—there's a nearby Cities Service office and Lubrication Engineer to serve you. For the address of the nearest office, write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

Look at the exclusive

HERCULES *Air-Cooled*

THE POWER-PACKED C2-90D

Two cylinders · 88 cu. in. displ. · 35 HP/3000 rpm

★ **Highest HP/Pound:** This rugged power plant packs more horsepower per pound dry weight than any other engine in its class: outperforms all other industrial air-cooled engines.

★ **Lower Fuel Consumption:** Higher volumetric efficiency means less fuel for the same power: up to 30% savings over competitive engines.

★ **Excellent Response:** Specially developed, two-barrel carburetor gives the C2-90D unequalled flexibility: keeps it "on top of the load" at all times.

★ **Wide Octane Tolerance:** The C2-90D can be run with gasolines from 75-100 octane rating: no need to "spoon-feed" this tough engine!

★ **Close Speed Regulation:** For constant speed applications, the Hercules C2-90D is unequalled: specially developed governor gives 2½% regulation from no-load to full-load, and regulation of 1% and better has been realized.

★ **Fully Replaceable Bearings:** This feature permits complete "top overhaul": engine need not be dismounted for repairs.

★ **Full-Pressure Lubrication:** Direct-drive, gear-type pump gives positive lubrication to wear points for longer life.

★ **Rugged Construction:** Extra-heavy crankshaft is fully balanced; stellite-faced valves and seats are available for longer wear; main bearings are oversize—no field failures over the past three years.

★ **Easy Starting:** Hot or cold, with manual or automatic starting, the Hercules C2-90D kicks over quickly—in all weather, indoors or out.

AND THE COMPANION CV4-180 . . . IN A CLASS BY ITSELF!

Four cylinders · 176 cu. in. displ. · 71 HP/3000 rpm

★ **71 Horsepower:** No other industrial air-cooled engine comes close to the power range this V4 offers!

★ **Responsive Power:** Carburetion system, governor, and "oversquare" bore/stroke ratio combine to give the Hercules CV4-180 excellent response and close regulation, no-load to full-load.

★ **and Economical, Too:** The Hercules CV4-180 has excellent fuel economy; has all the maintenance-saving features of the C2-90D too, for long-term operating economy.

AND MOST WEARING PARTS ARE INTERCHANGEABLE BETWEEN BOTH ENGINES!

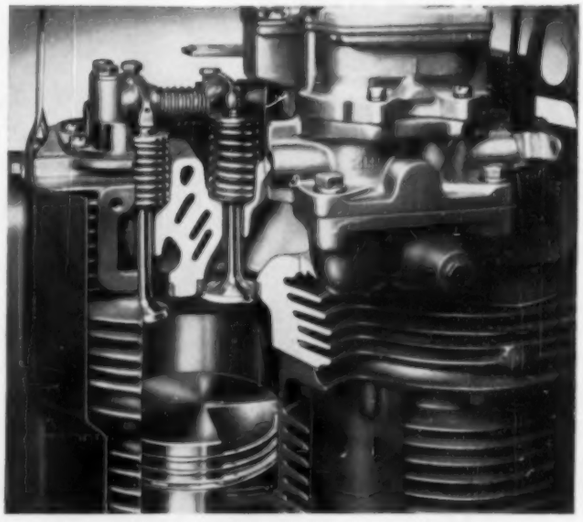
benefits you get with
ENGINE POWER

★ EFFICIENT COMBUSTION CHAMBER DESIGN evolved by Lycoming, designers of these air-cooled engines, is clue to their outstanding performance.

Sealed down-draft carburetor especially developed for these engines enables them to pick up load *fast* over entire speed range.

Overhead valves permit high compression at high efficiency. The exhaust valve runs cool too, without the need for an "over-rich" mixture. **Short intake manifold** delivers mixture at high turbulence, giving these engines wide octane tolerance and **LPG fuel** can be used without excessive loss of power rating. **Stellite-faced valves and seats** give long service and **double tapered piston rings,** with chrome-plated top ring, retain their seal at all speeds. **Honed cylinders** hold oil film even over long shutdown. **"Oversquare" design,** where bore dimension exceeds stroke, gives slower piston speeds and longer life—helps make engine responsive.

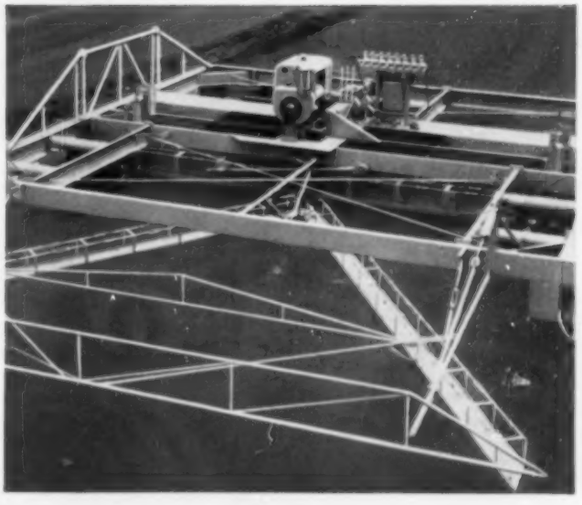
Exhaust manifold provides low back pressure, another factor in efficient operation.



★ AND JOB-RATED TESTING means you get the power you specified!

Every Hercules air-cooled engine is given a complete test run before it is shipped. This check of the actual horsepower delivered by your engine is your guarantee of proved performance and workmanship.

And Hercules air-cooled engines will stand up under constant, grueling service conditions, too. After a 1000 hour test run, all parts of a Hercules C2-90D were within original design tolerances—dramatic proof that these outstanding engines are built for endurance.



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Please send more information on the Hercules
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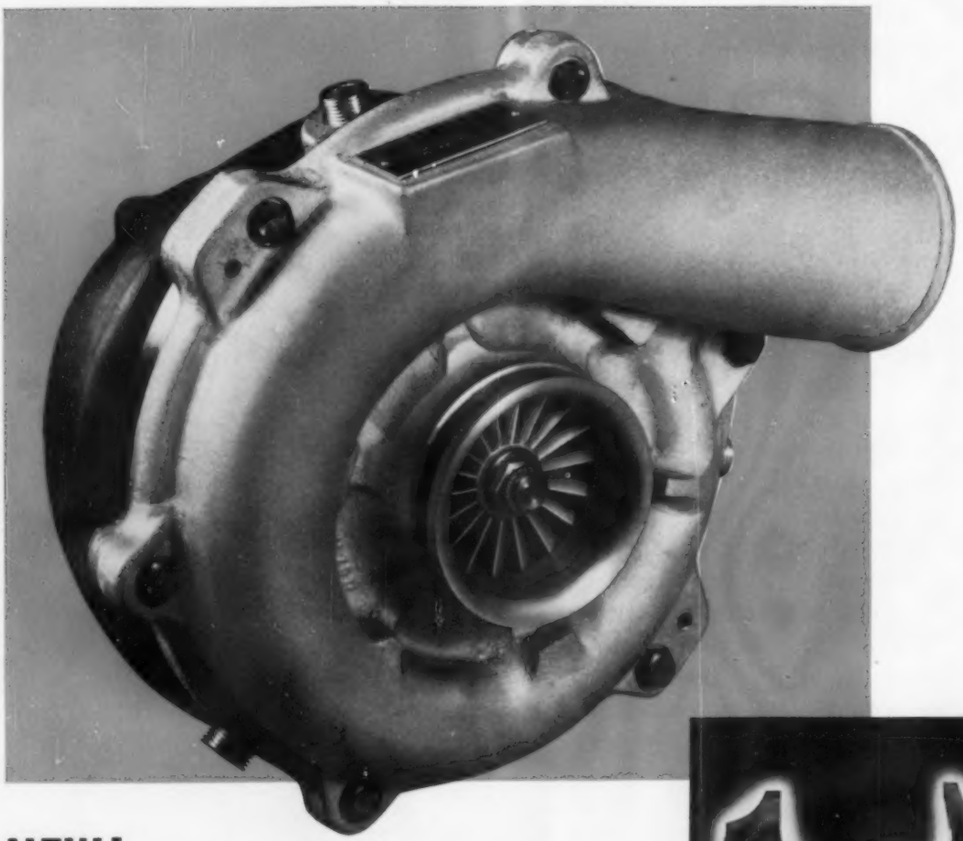


NEW! Simpler housing and one-piece bearing reduce maintenance on Thompson Turbocharger

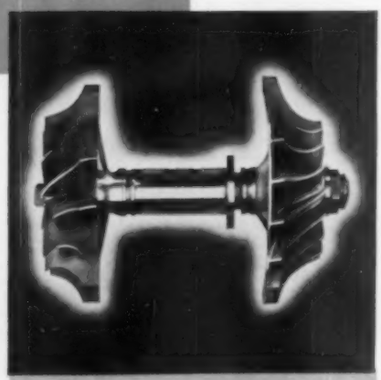
Designed for 10,000 operating hours under the severest operating temperatures and speeds. This means longer revenue runs between scheduled maintenance of the unit, and fewer unscheduled downtimes for repairs.

Turbine housing of the new Thompson Turbocharger is a heat-resistant alloy designed to eliminate corrosive attack and to be free from service cracks. Design also isolates high-temperature exhaust drive from bearing and air-side of turbocharger to increase maintenance-free life.

Bearing is one-piece design, mounted on small diameter shaft to reduce bearing surfaces speed even at high rpm.

Design of impeller supplies supercharging air at equal compression ratios over a larger flow range and at lower rotor speeds than other turbochargers. Light-alloy rotor provides instant response to changes in engine speed and load.

Your blown diesel engines up to 300 horsepower can be readily equipped with new-design Thompson Turbochargers. Our engineers will help. When may they call?



Write today on your company letterhead for Booklet DPR-758 which contains technical data on Thompson Turbochargers for blown diesel engines up to 300 horsepower.

JET DIVISION

Thompson Products, Inc.

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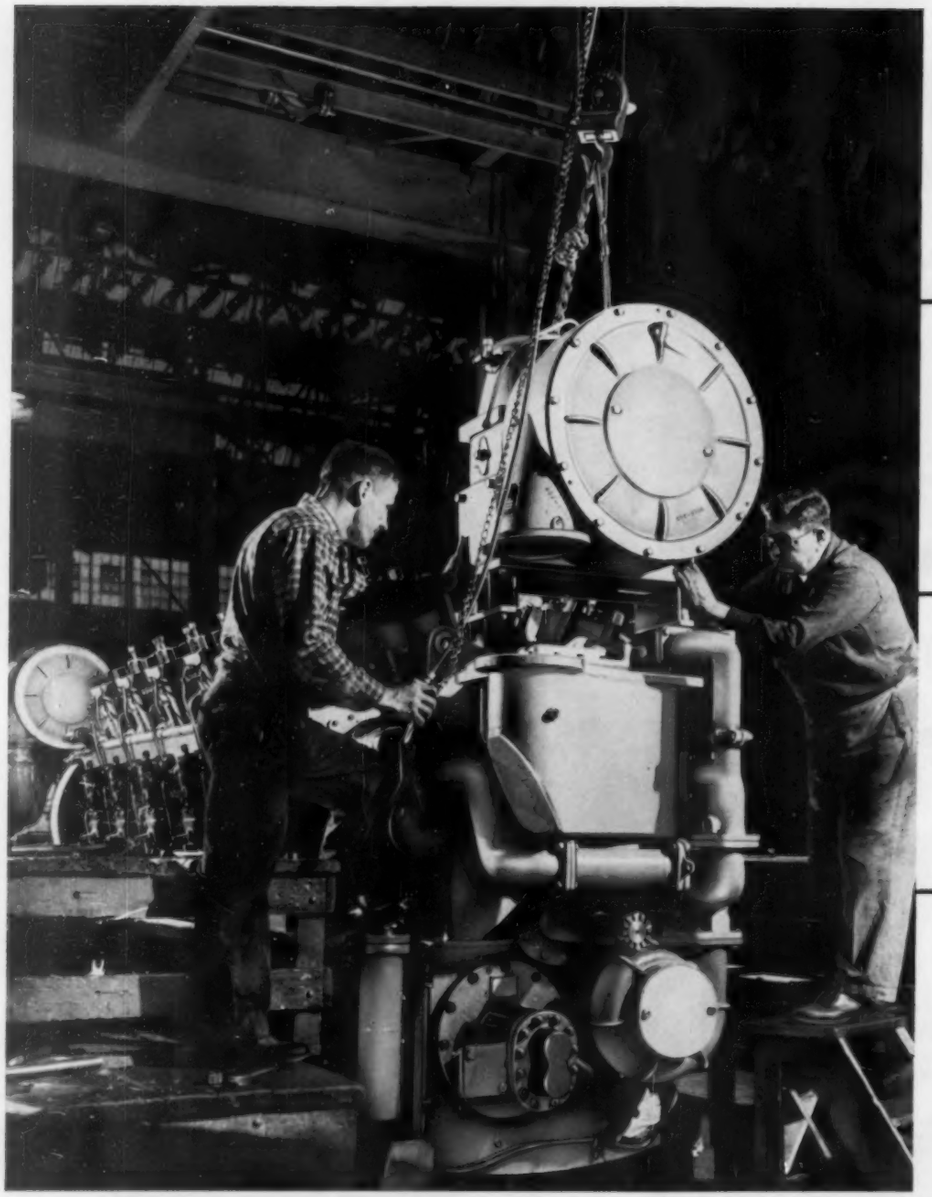
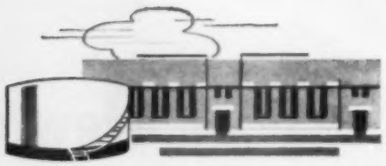
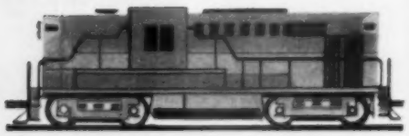


For added power with higher overall efficiency, the ALCO turbosupercharger is an integral part of each ALCO diesel engine in the 750-2400 hp range.

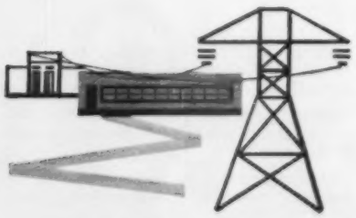
MARINE



PIPELINE



LOCOMOTIVE



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A BIG POWER BONUS is added to every ALCO diesel engine with turbosupercharging. ALCO first introduced diesel turbocharging in 1936, and today ALCO alone builds a complete line of engines and turbochargers as matched components. Proved in railroad, pipeline, power-generating, marine and oil-drilling service, a turbocharged ALCO 251 diesel in your next installation will provide the extra margin of profit that modern operations demand.

ALCO

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SCHENECTADY, NEW YORK

DIESEL-ELECTRIC LOCOMOTIVES • DIESEL ENGINES • RENEWAL AND MODERNIZATION PARTS • REPAIR AND REBUILD SERVICES

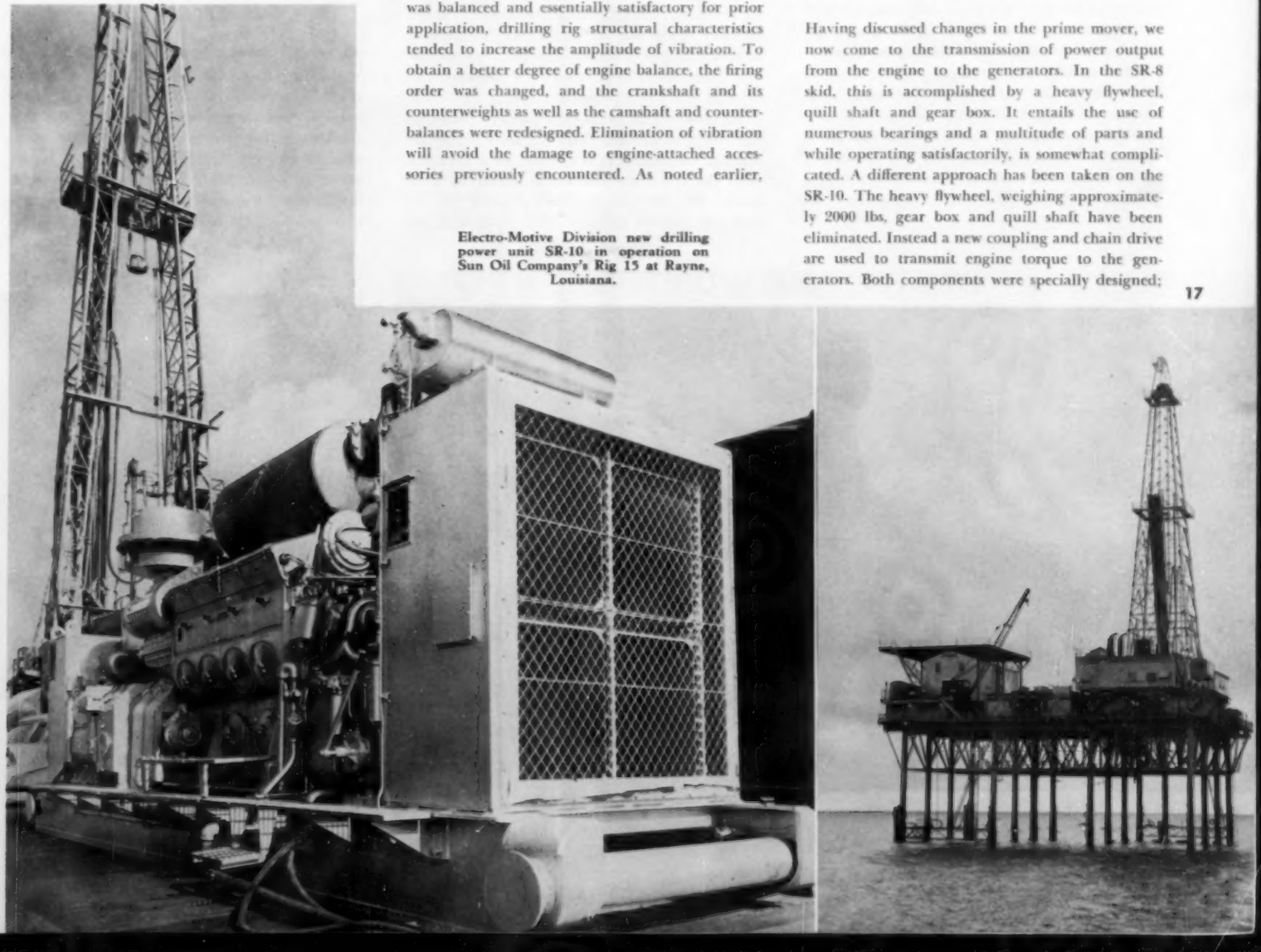
ADVANCES IN DIESEL ELECTRIC UNIT DESIGN FOR OIL WELL DRILLING

THE following article contains excerpts from a presentation by B. H. Hefner, Chief Electrical Engineer of Electro-Motive Division of General Motors Corporation, on advances in design of the EMD diesel electric oil well drilling power package. This article deals primarily with Modifications of the Prime Mover, Engine-Generator Transmission Improvements, Generator Improvements and Independent AC Power Supply. Comparisons are made between the earlier SR-8 unit and the new SR-10 unit designs.

About a year ago, it was felt that sufficient units of the Electro-Motive diesel electric drilling package had been in the field and enough data gathered to design a new model diesel-electric power package. Suggestions and recommendations of drilling industry personnel in cooperation with EMD design and development engineers facilitated the engineering work involved. Designated model SR-10, the new unit reflects design advances in major components, as well as in numerous minor refinements. Before discussing the new equipment in detail, it will be useful to make a general comparison of the current and new model. Figure 2 shows a schematic rendering of a typical SR-8 skid. On the SR-8 skid the two main generators are driven from the engine by a quill shaft into a fairly large gear case. Two auxiliary generators are used for excitation to the main generator fields, and are mounted piggy-back on the main generators, together with the excitation cabinet. Generator cooling is taken from a mechanical blower attached to the engine. The cooling system is a type utilizing an eddy current clutch and its associated equipment. Figure 3 is a rendering of the SR-10 skid. It can be seen, for instance, that the accessory end of the unit is considerably simplified. The eddy current clutch and associated equipment has been eliminated, as well as the radiator shutters and their necessary controls. The mechanical drive has been simplified and reduced in size, as have other components such as the engine control cabinet.

On the new skid, the engine designation is 567CR rather than 567C, as previously. This is to indicate that while the engine is essentially the same, it has been appreciably improved. In addition to increasing the hp output from 875 to 1000, the engine has been modified to reduce vibration, and its cooling system has been simplified. Vibration stemmed from the type of structure on which the power skids are used. Although the 567C engine was balanced and essentially satisfactory for prior application, drilling rig structural characteristics tended to increase the amplitude of vibration. To obtain a better degree of engine balance, the firing order was changed, and the crankshaft and its counterweights as well as the camshaft and counterbalances were redesigned. Elimination of vibration will avoid the damage to engine-attached accessories previously encountered. As noted earlier, the SR-8 engine cooling system is powered by an eddy current clutch with slip ring, brushes and excitation control and is equipped with radiator shutters and their associated control. On the new skid, the system is not only simpler but also provides improved temperature control. The fan is now directly driven from the lube oil pump on the engine, eliminating the eddy current clutch. Instead of shutters, air valves and relays, temperature control is provided by a water bypass type of valve commonly used in marine and drill rig applications. The new cooling system occupies 15 per cent less space than previously. The new cooling system made possible a neater, improved piping arrangement. It also permitted a reduction in the size of the engine control cabinet. The SR-8 engine control cabinet is three ft x two ft x eight to ten in. deep. The control cabinet on the SR-10 has been placed in the radiator shroud and occupies a space approximately eight in. x four in. x four in. This was possible because the control relays and magnetic valves associated with the eddy current clutch control and shutter control were eliminated. Substantial feet of copper tubing as well as cabinet space was saved by mounting fuel, lube oil and other gages directly on the engine instead of housing them in the control cabinet.

Having discussed changes in the prime mover, we now come to the transmission of power output from the engine to the generators. In the SR-8 skid, this is accomplished by a heavy flywheel, quill shaft and gear box. It entails the use of numerous bearings and a multitude of parts and while operating satisfactorily, is somewhat complicated. A different approach has been taken on the SR-10. The heavy flywheel, weighing approximately 2000 lbs, gear box and quill shaft have been eliminated. Instead a new coupling and chain drive are used to transmit engine torque to the generators. Both components were specially designed;



Electro-Motive Division new drilling power unit SR-10 in operation on Sun Oil Company's Rig 15 at Rayne, Louisiana.

the coupling by EMD engineers, and the chain drive in cooperation with the manufacturer. They are shown here in Figure 4. The coupling consists of a steel driving plate in which are mounted 24 one and one half in. steel bars. The bars, rubber bushing mounted, are bolted to the driven plate of the coupling. The driving plate is bolted to a flexible coupling on the engine output shaft, and the driven plate is bolted to the main sprocket of the chain drive. The combination of steel bars and rubber bushings results in a coupling which is sufficiently rigid to transmit horsepower but at the same time sufficiently flexible to absorb torsional stress between engine and chain drive.

The chain drive is six in. wide with a one and one half in. pitch. The main sprocket has 49 teeth and the generator sprocket has 33 teeth. The chain is operated at 5,115 ft/min. which results in a speed increase from 835 engine rpm to 1,239 rpm on the generators. The chain drive is rated at 810 hp based on 20,000 hours life. Past experience in chain lubrication has indicated that an improved technique was desirable. Therefore, a rather unique lubricating system was designed for the SR-10 rig. As shown in Figure 5, it consists of an oil slinger ring bolted to the main sprocket. The slinger ring has four oil openings which spray oil against three deflectors which direct the oil against the inside of the chain. Lube oil is fed to the slinger ring by gravity through a filler pipe. To avoid excessive splashing and foaming of the oil, a box is provided around the bottom of the slinger. At full load and full speed, the SAE #10 oil which is used as the lubricant, has a temperature rise of 60 degrees F., requiring no heat exchanger cooling. The lubricating system capacity is 15 gallons, but it will operate efficiently even with seven gallons. Tightness of the system is highlighted by the fact that after four months of operation, a unit equipped with this lubricating system required no addition of lubricant. The new chain drive has simplified rig construction. The coupling, chain drive and two generators are assembled as a unit sub-assembly. The sub-assembly components are aligned separately from the engine and the sub-assembly is then mounted on the skid and aligned with the engine with little difficulty. Also, the position of the generators is reversed from that on the SR-8 rig, which makes it easier to inspect commutators, brushes and other parts of the generator.

The main generator has been improved mechanically and electrically. Air discharge louvers are now of the automatic shutter type, which permit air discharge and which seal out water and foreign material when the motor blower is shut down. This eliminates the need for external sheet metal guards formerly used. Kilowatt output of the machine has been increased by as much as 15 per cent. This was made possible by using a larger copper cross-section in the main field and interpole windings. A third lead is brought out of the generator for flash-over protection, in addition to the protection provided by the control equipment. To prevent moisture difficulties caused by humidity and rain, the insulation was considerably improved. For instance, after assembly the entire stator is dipped in heat-reactive insulating resin to provide a still more effective moisture seal.

The main generators are, of course, dc machines and ac power is needed for various auxiliary equipment. On the SR-8 skid, ac power is supplied from the outside, from the customer or a source on the rig. However field experience indicated the desirability of the skid having its own independent ac power supply. This fits in neatly with the use of a chain drive, since it makes it convenient to drive an alternator to supply the ac power. While many choices were possible, a standard industrial type, 60-cycle, 230-volt alternator rated at 100 kw capacity was selected as best suited for the application. The prime objective was to provide an alternator with sufficient capacity to handle full rig load requirements as far as EMD equipment was concerned, rather than to use a smaller-capacity machine and divide the ac load between skid units. With the larger alternator, wiring connections are simplified and there is adequate protection in case of alternator failure on any one skid. It also offers protection to the rig operator in case his prime source of power, such as engine-generator sets, should fail. For example, on a three-skid rig, the alternator on No. 1 skid would supply the ac blow-

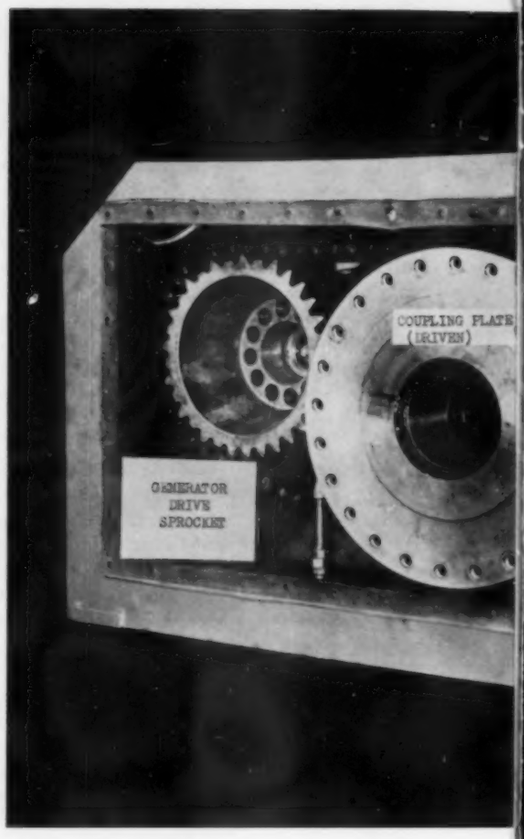
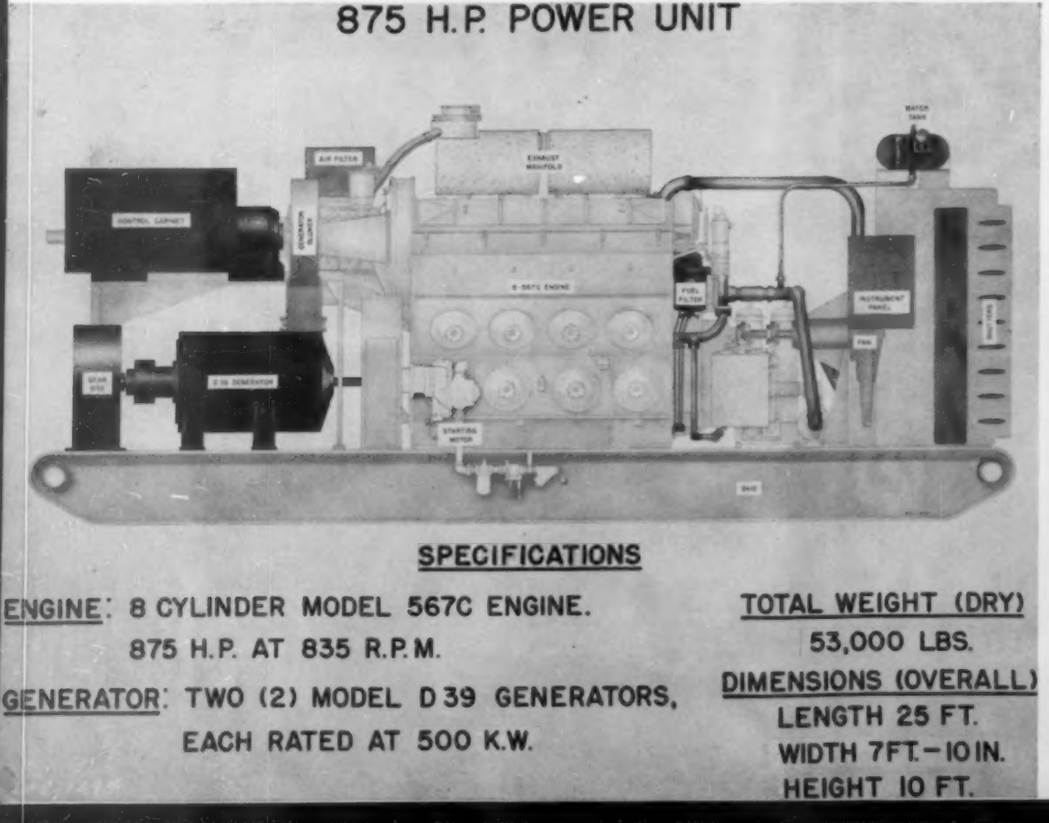
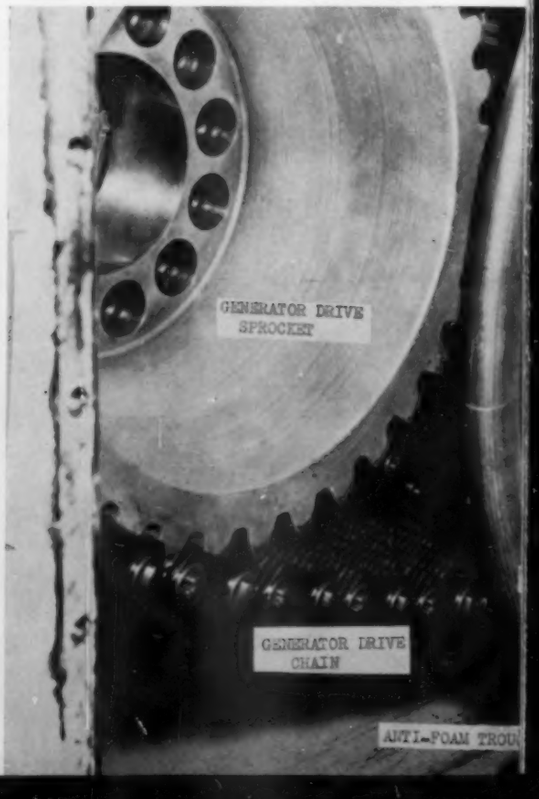
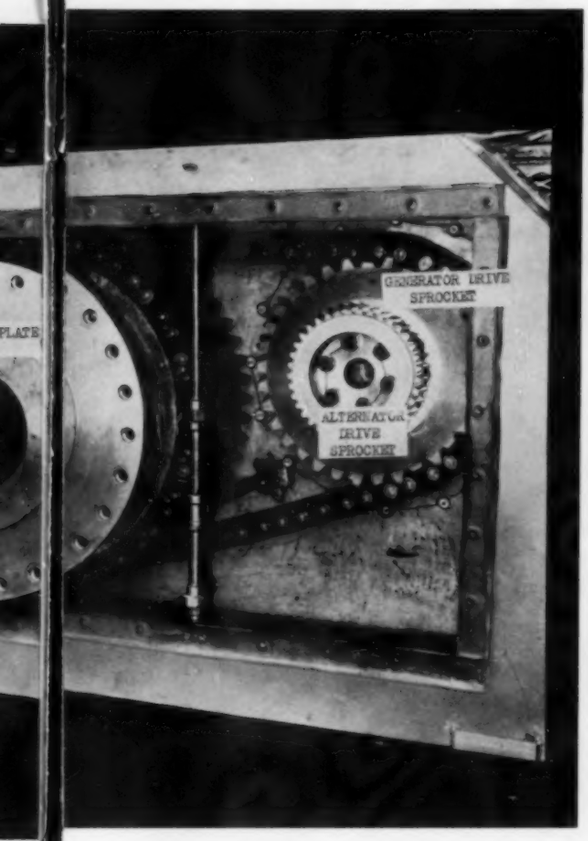


Figure 4

Figure 2



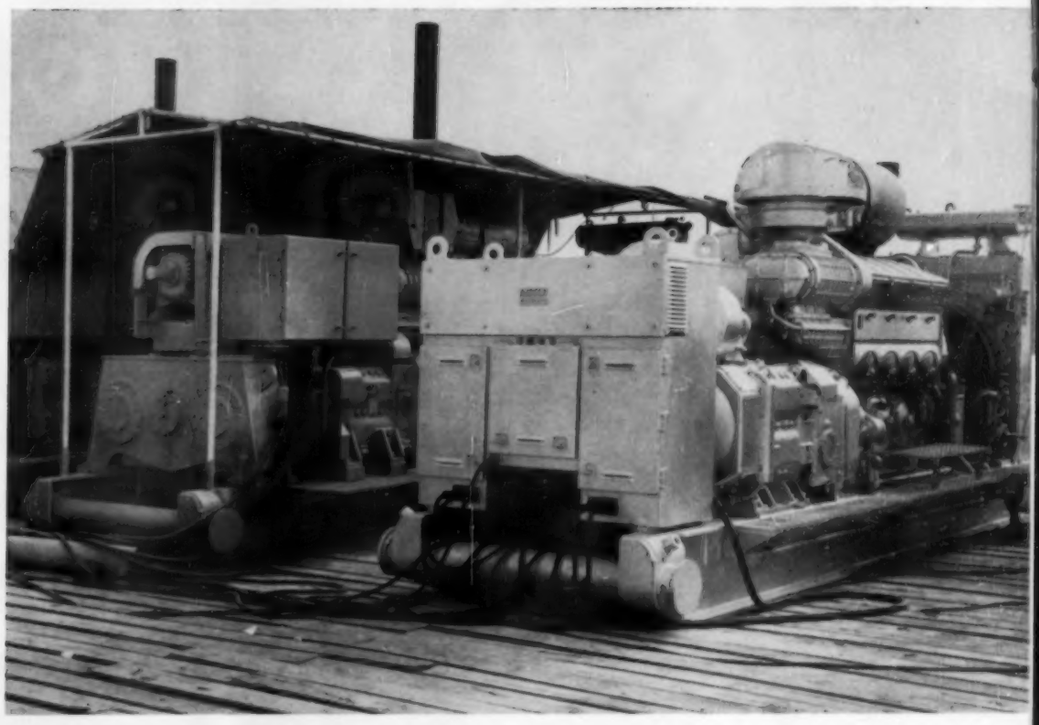




er motors on the generators and eleven motors, in addition to the excitation for the two generators on that skid. Number 2 skid alternator would supply the generator blowers and excitation for the generators as well as supply the blower motors in excess of the first eleven. The alternator on the third skid would supply the generator blower motors and excitation for two generators. There would then also be available approximately 150 kw for use by the driller in case of emergency. The alternator is compound chain driven from the engine chain drive. The alternator chain is ¾ in. pitch and three in. wide. The main drive sprocket for the alternator has 37 teeth and the alternator sprocket has 25 teeth. The speed ratio is 1.239 rpm on the main drive sprocket to 1,832 rpm for the alternator, with a chain speed of 2,860 ft/min.

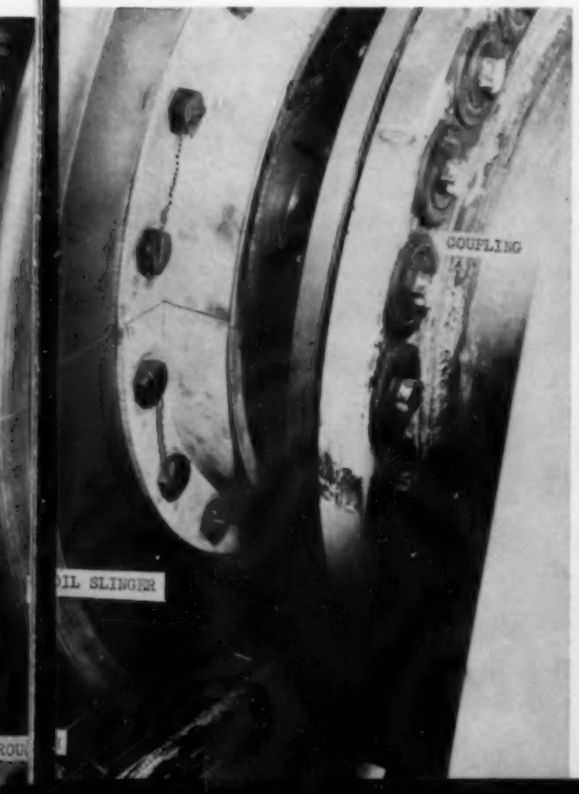
It should be noted too, that it is both possible and feasible to upgrade an operating SR-8 skid to an SR-10 with a significant saving over the purchase of a completely new unit. It is equally feasible to replace any one component with the new version found on the SR-10. To briefly review some of the advances made in the SR-10: 1. Greater engine, generator and motor horsepower; 2. Fewer components; 3. Less maintenance and easier maintenance for components requiring periodic servicing; 4. Completely independent power supply; 5. More flexibility in rig set-up; 6. Improved performance in control and operation; 7. Completely self-contained, except for the fuel and air supply.

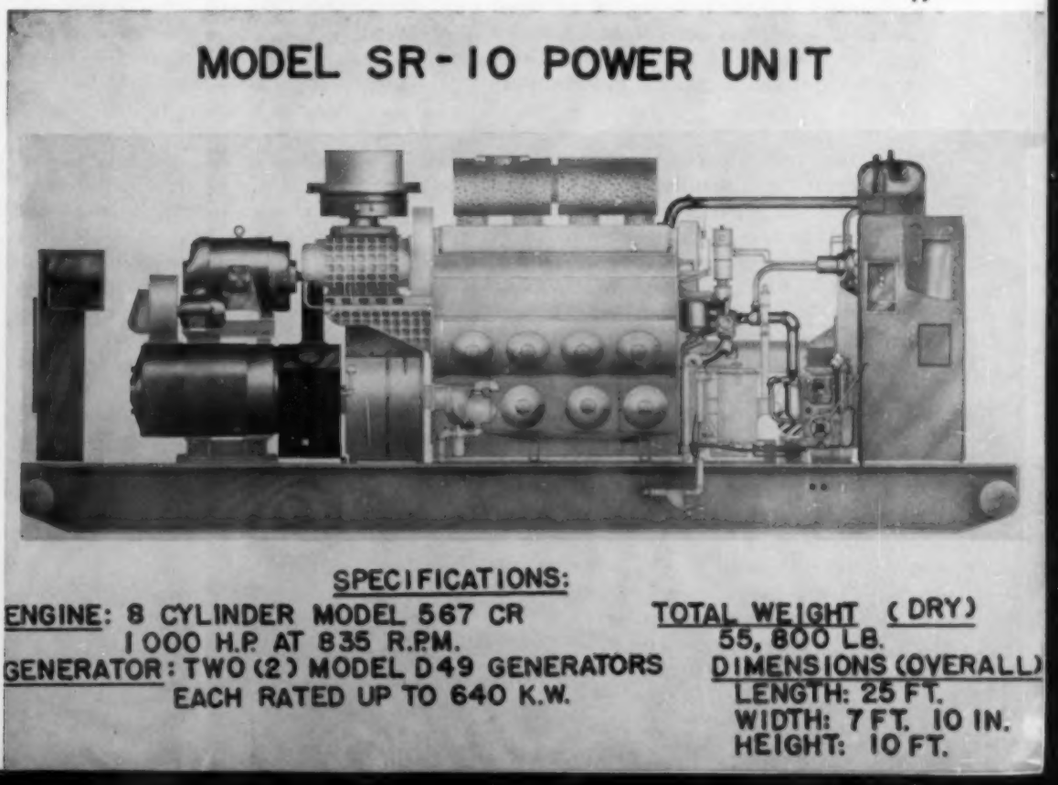
Figure 5



Another view of the Electro-Motive Division new drilling power unit SR-10 in operation on Sun Oil Company's Rig 15 at Rayne, Louisiana.

Figure 3





The 200-foot diesel towboat *Theresa Seley*, one of the largest and most powerful on the inland waterways, was christened March 5 at the Allegheny River wharf in Pittsburgh.

THE 200-ft twin screw *Theresa Seley*, built by Dravo Corporation, Pittsburgh, for Seley Power, Inc., was launched at Dravo's Neville Island shipyards, near Pittsburgh, on January 15, 1958. She was christened by the person for whom the vessel was named. Mrs. Theresa Seley, wife of Louis E. Seley, president of Seley Power, smashed the traditional bottle of champagne on the capstan in ceremonies at the Allegheny River Wharf. Mrs. Seley's aide was her husband's sister, Mrs. Ethel Sanger, also of New York. A. L. Mechling Barge Lines, Inc., will operate the *Theresa Seley*. Located in Joliet, Ill., Mechling Lines operates on the Mississippi River System and the Gulf Intracoastal Waterway, moving a variety of products. Her dimensions are: Length (molded) 200 ft; beam (molded) 45 ft; depth at side, amidships (molded) 12 ft; sheer forward 2 ft; draft with normal fuel 8 ft 9 in.; draft with surcharge of fuel (700 tons) 10 ft 2 in.

The *Theresa Seley* is powered by two Nordberg Supairthermal V-type diesel engines. Each engine is of the four-cycle, non-reversing marine type, with 12 cyl of 13-in. bore and 16½-in. stroke. Hindmarch-DeLaval reverse-reduction gears operate through a tangential spring coupling. The Supairthermal engines achieve high thermal efficiency and Maximum power output with minimum heat rejection to the cooling water and no increase in the internal temperatures. The exhaust gases drive a high pressure ratio turbocharger. High pressure air from the turbocharger passes through a fin and tube type intercooler and is delivered to the cylinder. Excess air is passed through the cylinder to increase the scavenging efficiency and a greater weight of cool air is trapped within the cylinder at the start of compression. This enables the engine to burn a larger amount of fuel thus increasing the horsepower.

The engines have a single piece, fabricated frame and removable, wet-type cylinder liners. There are two camshafts which are gear driven from the crankshaft. The engines can be started and stopped from the engine room only but there are two control stations for maneuvering—one in the pilothouse and one in the engine room. Pneumatic controls provide the means to control the engine speed and direction of rotation of each shaft with a single lever in the pilothouse. Among the features of the equipment are interlocking protection systems for engine starting and for shaft direction changes. Engine starting interlocks prevent starting unless turbo lube oil pressure, engine lube oil pressure and gear lube oil pressure are at established values and the barring gear has been disengaged. Another set of interlocks prevents either clutch from being engaged until the other is fully disengaged. A speed boost is also automatically provided during clutch engagement. These excellent engine and shaft controls for the five-bladed, 10 ft diameter twin propellers together with the two steering rudders and four backing rudders combine to give the boat exceptional maneuvering characteristics. This is the fourth pair of Nordberg 12 cyl V-engines to be installed in the 200-ft towboats built by Dravo Corporation.

Main engine lubricating oil is carried in three tanks—one 3000-gal. tank forward and two 1000-gal. tanks port and starboard aft. Sump tanks are built into the engine room bottom. Oil is drawn from them by pumps and put through two filters, which have a capacity of 350 gph and are equipped with heaters. Reduction gear lube oil and steering gear oil are stored in separate 500-gal. and 250-gal. tanks, respectively. One 3000-gal. and two 1190-gal. potable water tanks are located in the forward hold. Wash water is stored in the forepeak compartment. Raw river water is taken from the sea-chest by the filter feed pump which supplies raw water at 60 gal. per minute to one self cleaning filter and two cartridge filter units. River water also is chlorinated before it enters the storage tank. Two automatic heaters are provided, one for galley sink water and one for wash water. The vessel is heated throughout by steam from a 360,000-btu-per-hour oil-fired boiler. Located in the generator room, the boiler operates at a steam pressure of 15 lbs per square in.

The engine room is ventilated by three inlet fans totalling 20,480 cfm, two of which draw air through intake ducts in the side of the deck house and discharge into the forward end of the lower and upper engine rooms. The third inlet fan provides fresh air for the aft end of the lower engine room through ductwork from the fidley deck. The upper engine room is ventilated by two 7500-CFM exhaust fans in the aft bulkhead of the fidley. The

generator room is ventilated by two 4575-CFM intake fans and a 7240-CFM exhaust fan. The two five-bladed 10-ft-diameter stainless steel propellers are housed in cast steel Kort nozzles. Supporting the propeller shaft is a strut cast into the nozzle aft of the propeller. The strut bearing is a self-aligning roller bearing fitted with special seals and lubricated by a closed oil system. A 10-in.-diameter line shaft, consisting of two lengths connected by flange-type couplings, runs between the reduction gear of the engine and the tail shaft. A special coupling connects the line shaft to the 11½-in. diameter tail shaft. Three anti-friction bearings are supplied for the two shafts.

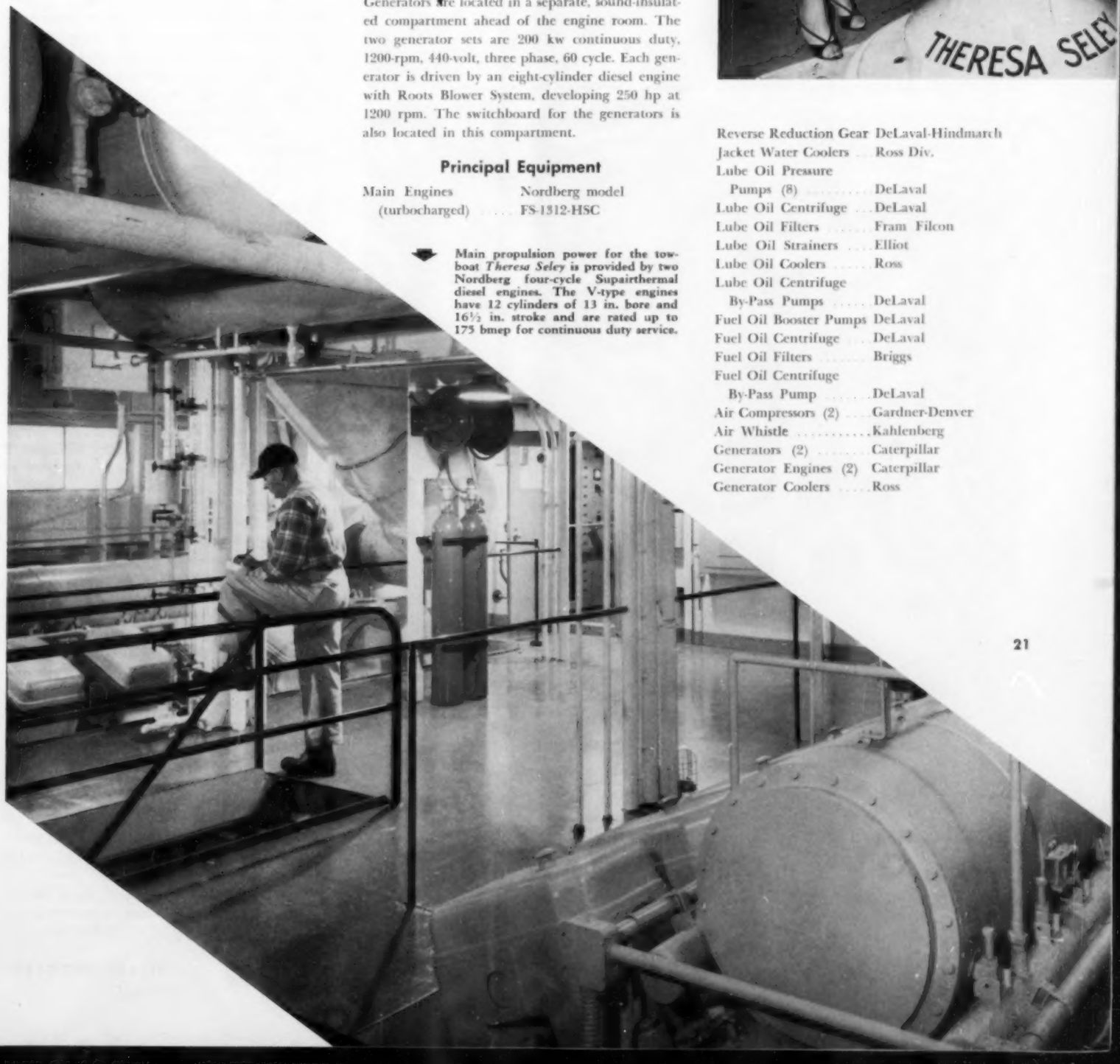
Two hydraulic rams, one 14-in. for the steering system and one 12¼-in. for the flanking system, control the two steering and four flanking rudders. A 15-hp motor drives each of the two steering gear pumps. Closed center four-way valves, one for each system, control flow of oil to the rams. The steering valves are controlled in two ways—by an air system actuated by steering levers in the pilothouse and by an automatic pilot system. A selector switch in the pilothouse permits operations of only one system at a time. Fire-fighting equipment meets U.S. Coast Guard requirements and includes various types of semi-portable and portable CO_2 bottles and extinguishers. A fire pump supplies water to five fire stations located through the boat, each equipped with 75 ft of hose. Six alarm bells, at various points, are controlled from the pilothouse.

Generators are located in a separate, sound-insulated compartment ahead of the engine room. The two generator sets are 200 kw continuous duty, 1200-rpm, 440-volt, three phase, 60 cycle. Each generator is driven by an eight-cylinder diesel engine with Roots Blower System, developing 250 hp at 1200 rpm. The switchboard for the generators is also located in this compartment.

Mrs. Theresa Seley smashes the traditional bottle of champagne on the capstan of a new diesel towboat bearing her name. The 200-foot vessel, *Theresa Seley*, built by Dravo Corporation for Seley Power, Inc., was christened March 5 in Pittsburgh. Mrs. Seley is the wife of Louis E. Seley, president of Seley Power.

Principal Equipment

Main Engines (turbocharged)	Nordberg model FS-1312-HSC
Reverse Reduction Gear	DeLaval-Hindmarch
Jacket Water Coolers	Ross Div.
Lube Oil Pressure Pumps (8)	DeLaval
Lube Oil Centrifuge	DeLaval
Lube Oil Filters	Fram Filcon
Lube Oil Strainers	Elliot
Lube Oil Coolers	Ross
Lube Oil Centrifuge By-Pass Pumps	DeLaval
Fuel Oil Booster Pumps	DeLaval
Fuel Oil Centrifuge	DeLaval
Fuel Oil Filters	Briggs
Fuel Oil Centrifuge By-Pass Pump	DeLaval
Air Compressors (2)	Gardner-Denver
Air Whistle	Kahlenberg
Generators (2)	Caterpillar
Generator Engines (2)	Caterpillar
Generator Coolers	Ross



Main propulsion power for the towboat *Theresa Seley* is provided by two Nordberg four-cycle Supairthermal diesel engines. The V-type engines have 12 cylinders of 13 in. bore and 16½ in. stroke and are rated up to 175 bmep for continuous duty service.

MOBILE DIESEL-COMPRESSORS HELP SUPPLY LIQUID OXYGEN FOR ARMY MISSILES

Two 1200-hp Fairbanks-Morse OP Diesels Drive New-Type F-M Rotary Compressors, Supply 100-lb Air to Air Products Process Units

TO solve the problem of fueling Army missiles in the field, Fairbanks, Morse & Co. has built what is believed to be the world's most powerful trailer-mounted diesel-compressor plant. Two of these revolutionary compressor vans together with a pair of Air Products processing units constitute a complete self-sufficient liquid oxygen plant capable of producing 20 tons of LOX a day. This million-dollar plant, developed by the U.S. Army Corps of Engineers and the equipment manufacturers, solves one of the Army's most difficult logistical problems—supply of liquid oxygen to missile launching sites on any potential battlefield.

The tremendous propellant power required for the Redstone missile, for example, is obtained by the combination ethyl alcohol with liquid oxygen. Rising to great heights where there is little or no oxygen for combustion purposes, a missile must carry her own huge supply of this essential oxident. A fantastically cold, light-blue liquid, produced and handled at 297 degrees below zero, LOX is the best oxidizing agent known. Pure oxygen has more than four times the combustion power of air, and liquid oxygen has 600 to 800 times the combustion power, volume for volume, of gaseous oxygen. This tremendous concentration of energy potential has made liquid oxygen a mainstay in missile propulsion. Large quantities of LOX are needed for a missile, whether in flight or to keep it ready for launching. Without the extremely cold temperatures needed to keep LOX in a liquid state, it boils away rapidly and cannot be stored in any quantity for very long. In addition, missile bases are prime targets and the bases and all supporting equipment must be capable of movement on short notice. Obviously the conventional industrial LOX plant could not meet these requirements. The problems are solved by the compact mobile plant, which can produce 20 tons of 99.5 percent pure liquid oxygen per 24-hour day near any missile launching site. It was an engineering achievement to compress this volume-production industrial plant into four semi-trailers, each 30 ft long, 8 ft wide and 11 ft 2 in. high. Fairbanks-Morse was assigned the job of producing the two air supply units, each including a complete heavy-duty diesel power plant and a compressor capable of delivering vast quantities of air at 100 psi.

Powered by alcohol and liquid oxygen, a Redstone missile probes the stratosphere.

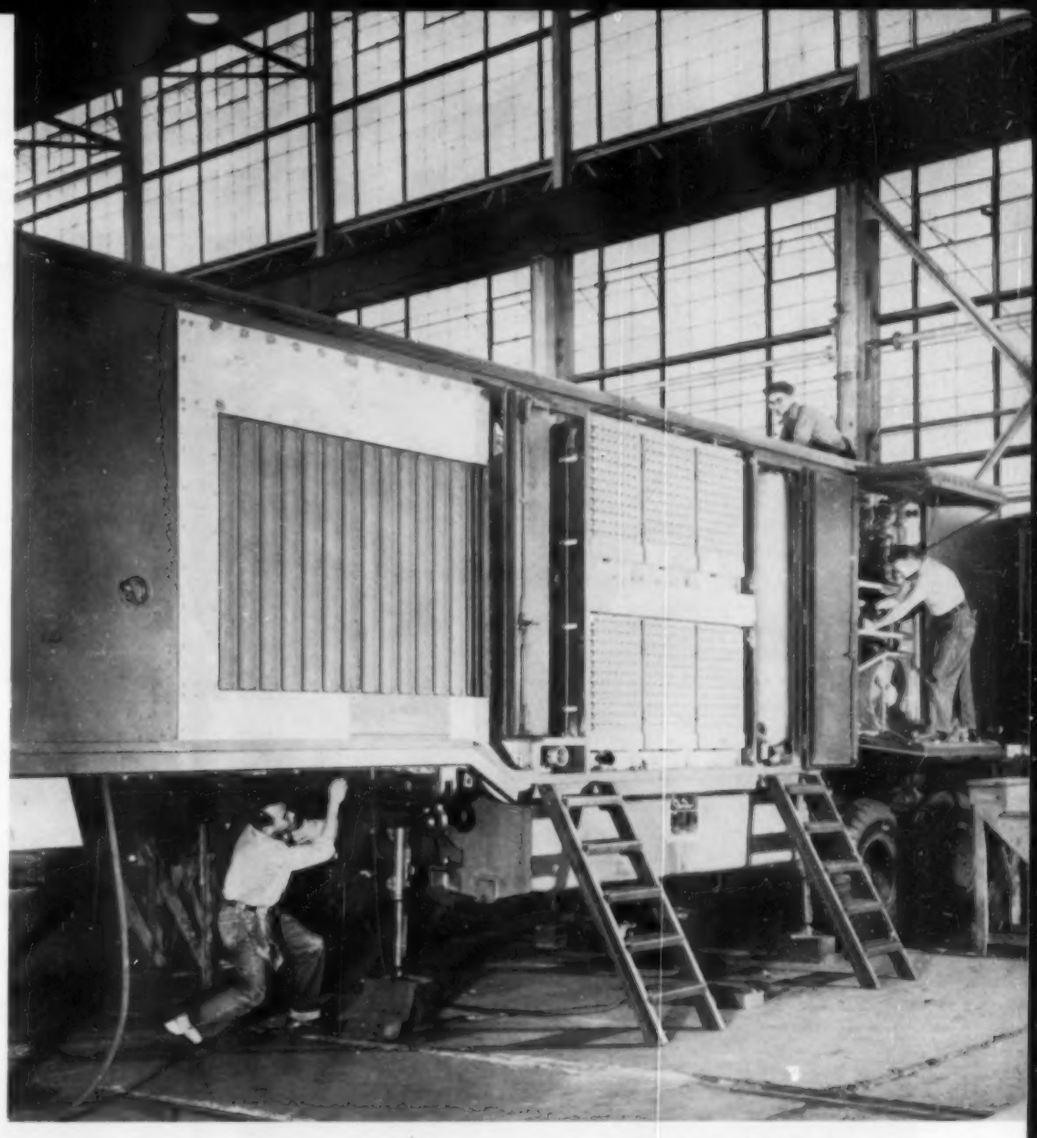
The engine used is the compact Fairbanks-Morse opposed-piston diesel, a time-tested prime mover long standard on Navy submarines, ice breakers, and in countless other heavy-duty applications. The 8-cylinder engine in each air supply trailer is rated at 1200 horsepower at 1200 rpm. The Fairbanks-Morse compressor built for the LOX plant is a revolutionary new two-stage screw-type unit never before used in this country. It is expected to have wide application in civilian industrial service. The diesel plant is completely self-sufficient, needing only a supply of fuel oil. To eliminate need for external supply of cooling water, an extended-surface heat exchanger was built into the van. All fuel, lube and air filters, pumps and control equipment were built in. F-M engineers still were able to leave space for later installation of a generator if it is decided to use the diesel to supply electric power. The entire diesel-compressor trailer weighs just 50,000 pounds.

The two F-M compressors supply air to the Air Products Process vans which contain heat exchanger and air separation equipment. Air, under

pressure, is fed into the heat exchanger unit. Intensely cold by-product nitrogen, passed back from the air separation unit, cools the air as it moves through these chambers and freezes out such impurities as water vapor and carbon dioxide. The air is periodically re-routed through alternate passages by reversing valves and check valves, while these impurities are ejected by a blast of nitrogen.

The air leaves this 46,000 lb unit very near to a liquid state. The 38,000 lb air separation unit completes the process of changing the cold compressed air into liquid oxygen and by-product nitrogen. Partly liquidified air, produced by heat exchange with discarded nitrogen gas, is first separated from gaseous air by a centrifugal separator subcooled and passed into the distillation column, where the nitrogen is separated from the liquid oxygen by evaporation. The pure LOX can then be drawn off and hauled to the missile site in special low-temperature trucks, having a capacity of nine tons.

A key factor in the success of this complex LOX plant is the economy and efficiency of the equipment. Approximately 2 pounds of LOX can be produced for every pound of fuel oil consumed by the diesels. Eleven of these million-dollar plants have been ordered by the Corps of Engineers. An important byproduct of the LOX plant development is the possibility of wide use of the new F-M compressor. "Although this machine was developed under a defense contract," Robert H. Morse, Jr., President of Fairbanks, Morse & Co., said, "it has an unusual variety of applications to private industry." Because of the efficiency and economy of the unit, F-M engineers feel the compressor will find use in such industries as: 1. Process industries —chemical plants, oil refineries, petrochemical plants, natural gasoline plants, food processing, metal processing. It could be used for both pressure and vacuum systems including industrial and instrument air, process refrigeration, gas and vapor recycling, acid production, catalytic cracking operations, fermentation processes, yeast production, aeration and agitation of gases, vapor recovery and other applications. 2. Heavy industries such as automotive and aircraft plants, shipyards, steel mills and foundries. Uses would include industrial and instrument air, by-product gas boosters and exhausters, combustion air and oxygen production. 3. Utilities, including power plants and consumer gas companies and municipal sewage treatment plants. Industrial and instrument air, gas distribution and storage, and aeration would be among the uses. 4. Research and test facilities including government and industrial installations could make use of the compressors for wind tunnel and engine test. 5. General industry such as glass, textile, metal stamping plants need compressors for industrial and instrument air. 6. Natural gas industry for gathering and transmission of gas.



Workmen put finishing touches on the diesel-compressor unit at the Fairbanks-Morse Beloit Works in Wisconsin.

The new 20-ton-per-day liquid oxygen plant is tested by the Corps of Engineers. The two Fairbanks-Morse diesel-compressor trailers flank the pair of Air Products process vans. The mobile plant is designed to serve U. S. missiles such as the Army's Redstone anywhere in the field.

LONG ARCTIC NIGHTS DOUBLE POWER DEMAND, KEEP HAY RIVER'S DIESELS ON THE LINE

By JAMES JOSEPH

HAY River, Northwest Territories . . . in the midnight blackness of 7:30 a.m., youthful Bill Napier kicks the snow from his boots, works out of his parka and heads for the engine room. Two diesel electric sets—both Caterpillar D-13000s—are already on the line (and have been thruout the night). Napier nods to the operator on duty—Canadian-born Clarence Hornick—and readies to start-up a third, this to catch the breakfast load. At 11:30 a.m., the engine—an International UD-18A—will be shutdown. Not until 4:00 p.m., with night closing in again, will it be time to start-up another, timed for the evening peak that'll come at 4:30 p.m.

Here, but a hefty snowball's toss from the Artic Circle, it is winter, the mercury registering a frosty minus 40 degrees. But Napier, plant superintendent for Northland Utilities Ltd's Hay River diesel electric plant, doesn't need a thermometer to judge the season. He needs merely to glance at his operational log. For power demand—here in Canada's frigid Northwest Territories—nearly doubles during January, when the Arctic night lingers for sixteen dismal hours. But in July, with the sun still edging the horizon at midnight, electrical consumption plummets. Such are the logistics of consumer demand along the shores of Great Slave Lake, fifth largest lake in all North America, 12th ranked among the lakes of the world. Yet ironically, the Slave—the source of the Mackenzie river—is perhaps the least known of waters (this tho it spans some 11,170 square miles, is 325 miles long and plunges, in spots, to depths of 2200-ft).

Napier's cumulative 30-day log tells the power story:

Oct/Nov 1956	72,000 kw
Nov/Dec 1956	82,618 kw
Dec/Jan 1957	93,234 kw
Jan/Feb 1957	90,000 kw
June/July 1957	54,000 kw

What's more, peak loads during the dark months come early—at 4:30 p.m. In the 16-hour light of a summer's day, load peaks at 6 p.m., fully 1½ hours later. Says Napier, "doesn't matter how great the load, or when it peaks, we're ready for it." Ready, too, are Hay River's four hard-working diesel electric sets (three Caterpillar D-13000s and a UD-18A International). And, as tho anticipating load-to-come, Northland is right now installing a fifth engine—a Cooper-Bessemer GS-6 driving a 275 kw English Electric generator.

Unitized control—station superintendent Bill Napier checks UD-18A's Ready Power panel, engine mounted.

For, along the shores of the Slave, industry—and exploration—is astir. Annually from Great Slave Lake comes a whopping 9,000,000 pounds of white fish and trout, destined for Chicago and New York markets. Fishing here never ceases. In winter, beetle-like snowmobiles—the Canadian-made Bombardiers—shuttle between Hay River's packing houses and hundreds of fisherman who, ensconced in skid-mounted shacks, fish Great Slave Lake's deep and icy waters (thru holes punched in the 4-ft. thick ice.) Grown up around the fisheries is the town—still dominated by Hudson's Bay, the trapper, Royal Canadian Mounted Police and Slavi Indians. But on the Horizon lurks new wealth—oil. Already probing permafrost and muskeg are a dozen oil companies (among them Shell, Socony-Mobil and Rockefeller interests). Oil, if found in substantial quantities, would mean an even bigger bonanza than when commercial fishing first opened in 1945.

Yet it wasn't until six years later, in 1951, that Northland put the Hay River station—the utility's only plant above the 60th parallel—into operation. Northland, headquartered in Edmonton, Alberta, operates nine power plants in Alberta, Saskatchewan and the Northwest Territories, all of them dieselized with exception of its Fairview and Athabasca, Alberta, plants whose engines are natural-gas fueled. Serving Jasper, Alberta, is a 2000 kw hydro station. "Boss an operation as isolated as ours," says Napier, who has headed the Hay River plant since 1953, "and you've got to know engines—and how to make them behave." Last month, for example, Napier and his three operators put in a couple of new valves. And, when the crankshaft shattered some months ago, they pulled it, installed a new one—and never for a moment thought of summoning "outside" help.

"After awhile," shrugs Napier, "you grow to depend more on your stock bin—and know-how—than on communications." Communications, always tedious in the sub-Arctic, have a way of throwing the diesel plant maintainer upon his own resources. For example, a Canadian Pacific plane flies in from Edmonton three times a week—weather permitting. Buses, plying the dangerous, ice-sheathed MacKenzie highway which bee-lines north 381 miles from Peace River, offer something less than express service. Napier's only direct-to-home-office link is via the Canadian Army Signals telegraph net—which binds the thinly populated north country.

Thus, the Hay River plant stockpiles against shortage: three above ground diesel fuel tanks (5500, 3600 and 2600-gallons) feed the engines. Buried alongside each engine is a 120-gallon day tank. And one of the motivating reasons for diesel standardization (the station's first three engines were identical) stemmed from the interchangeability of their parts. Hay River's original two Cats came from the famed wartime "Canol Line", which ran between Norman Wells, in the Northwest Territories, to Whitehorse, in the Yukon. Hay River's fuel oil still comes from Norman Wells refineries—operated by Imperial Oil, Ltd.

River-barged into Hay River—more than 1000 river miles—is the station's winter fuel supply. Because the river ices early, Hay River must have its fuel by October 15th—or not at all. Fuel costs run high—to 30.2 cents the imperial gallon (1/5 larger than U.S. gallon), compared to a third that cost Stateside. "But," shrugs Napier, "nothing much goes wrong with the engines. They're dependable . . . as oxen."

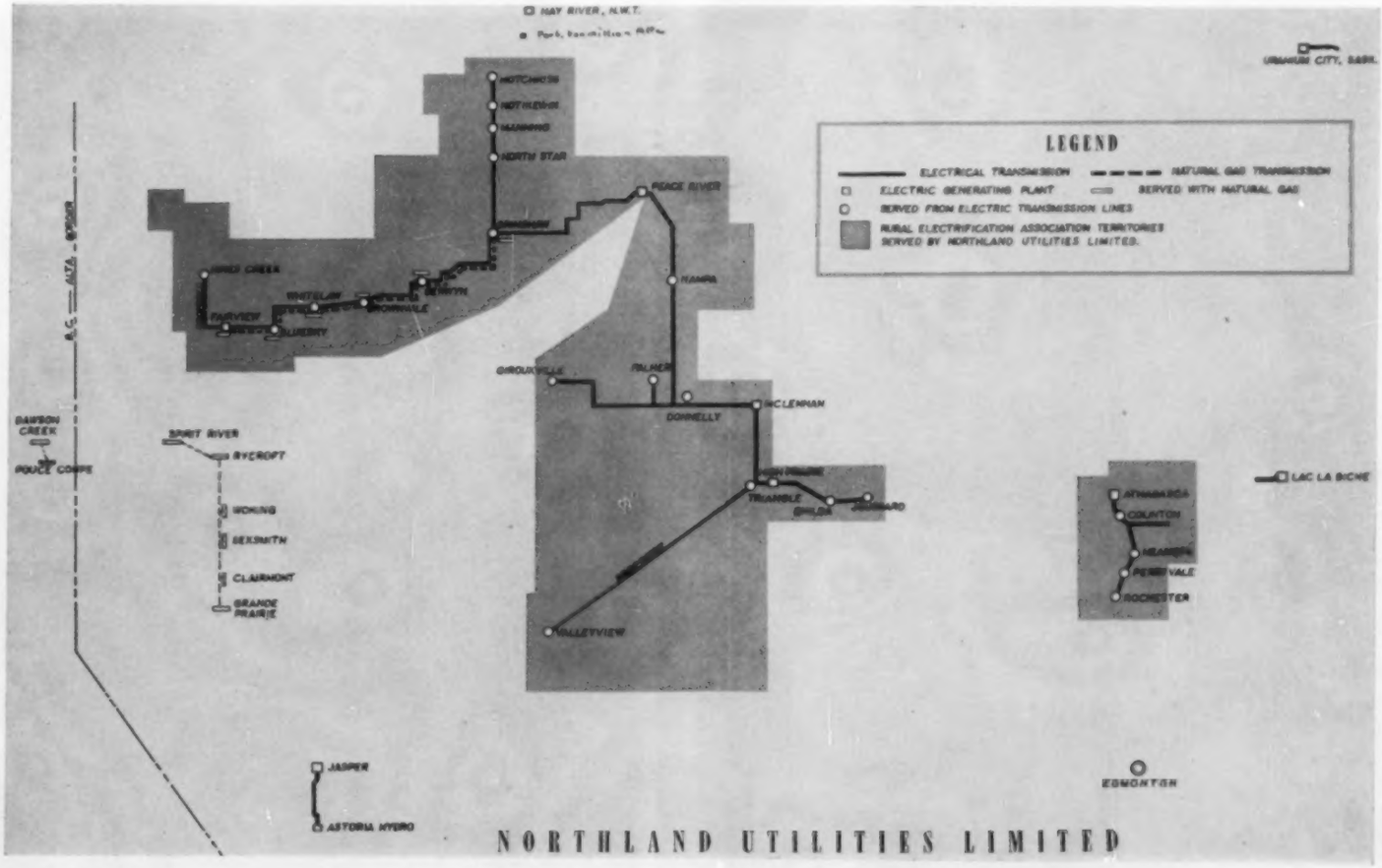
Northland's Hay River plant became operational with two 123 hp Caterpillar D-13000s (75 kw, 900 rpms, 147.5 amps, 112.5 kva). One engine's installed with a Canadian-made Robbins & Meyers dc exciter (110 volts, 13.5 amps, 5 kw). The other—a Fairbanks-Morse exciter—is rated 3.5 kw, 125 volts. A third D-13000 was added in 1952, the engine directly coupled to a Caterpillar generator. Generator is rated 75 kw at 900 rpm (28.4 amps, 93.8 kva). Its exciter is rated 1.15 kw at 1750 rpm, 120 volts, 9.5 amps.

In 1956, the station installed its fourth diesel—an International UD-18A driving an Electric Machinery generator (60 kw at 1200 rpm). The 6-cylinder engine—with 691.1 cubic inch displacement—has a bore of 5¾ inches, a stroke of 7-inches. Its exciter—by Electric Machinery—is rated 24 amps at 1200 rpm. The International, equipped with a Ready Power central cabinet (engine-mounted) is started from a 12-volt battery. Like other station diesels, it exhausts thru a straight stack, without silencer.

Already poured is the foundation for a fifth engine, installation this summer. This will be a Cooper-Bessemer GS6, 4-cycle, 6-cylinder, rated 565 hp at 750 rpm, with a 10½-inch bore, a stroke of 13½-inches. The Bessemer will directly drive an English Electric generator (275 kw at 514 rpm). Serving some 225 customers (among them government facilities), Northland's Hay River plant transforms its output to 4160 volts, sends it out over 5 miles of primary circuit. The rates (residential): 10 kw at $2.50; 80 kw at $8.50. The average householder's bill runs $10 a month, more during winter's night-like days. Like all of Hay River, Northland's plant lies on permafrost. Building heat, melting the underlying stratas of ice, take their toll on buildings. Yet, tho the plant floor shows a few cracks, its engine foundations are solid as the ice underlying them. Less solid is a Hay River restaurant whose floor slopes 10 degrees front door to kitchen (more than one unwary patron has somersaulted in upon the now-not-so-startled chef).

The engines' 440 volt output is monitored by a central board, then stepped up (by pole-carried transformers outside the building) to the distributed 4160 volts. Only the International engine's output is separately monitored—by the Ready Power cabinet. Main power panel gauges centralize operations, record: (1) ac amps; (2) kilowatts; (3) dc amps; (4) kilowatt per day; (5) line voltage. In addition, the panel mounts a GE regulator and Fairbanks-Morse rheostat. Last Jan. 13th, for the first time, Hay River's peak load during any given fifteen minutes reached 220 kw. Previous high—in January 1957—was 170 kw. "We're growing," says Napier, "and so is the appliance load. Mention 'Northwest Territories' and most people respond 'Eskimos'. Yet we've got our share of washing machines, dishwashers and dryers—and it's this plant, and its diesels, which keep them going. Yes—even when the mercury skids to 59 below."

Central control—three of Hay River's four diesel engines are monitored from this board. Station super Bill Napier shown at board.



THE *ELDA* REPOWERS WITH MERCEDES BENZ

By ED DENNIS

SAFETY at sea was the number one object, Mr. Arthur V. Davis had in mind, when he ordered his 50 foot yacht *Elda* to be repowered from gasoline to diesel engines. The newly christened and repowered *Elda* has an overall length of 50 ft, a 14 ft beam and draws 4 ft of water. It was built by Krogerwerft in Rendsburg, Germany a few years ago and powered with gasoline engines of American make.

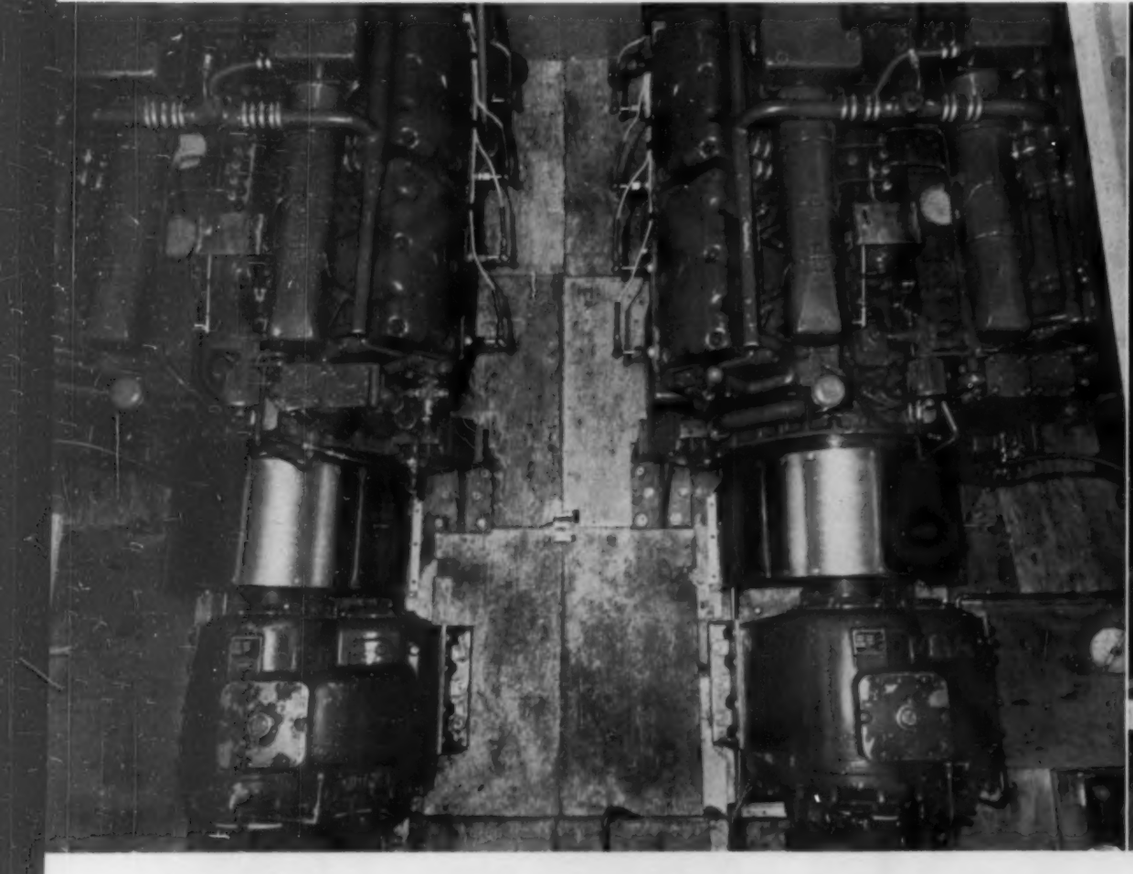
Arthur Vining Davis is one of America's industrial giants, a twentieth century adventurer in real estate and big corporation deals, a philantropist who started his career as a sixty dollar a month employee of the firm which eventually became the Aluminum Co. of America. Davis came to the Miami area in 1948. Since then he has acquired about 125,000 acres of Florida property of which about 7500 are in the Miami area, plus another 30,000 acres in the Bahama Islands. Being involved in such a fantastic number of business enterprises, which are reported to be several dozen and worth an estimated $350 million dollars, he likes to relax occasionally in the quiet of the sea.

The engines installed in place of the old gasoline engines were two naturally aspirated model MB-837-A Mercedes Benz diesels. They are 8 cyl 4 cycle "V" type, liquid cooled with a bore and stroke of 6½ in. x 6⅞ in. and have a piston displacement of 1823 cu in., the compression ratio is 17 to 1. Their horsepower rating is 451 intermittant bhp at 2000 rpm and a continuous bhp of 400 at 1800 rpm.

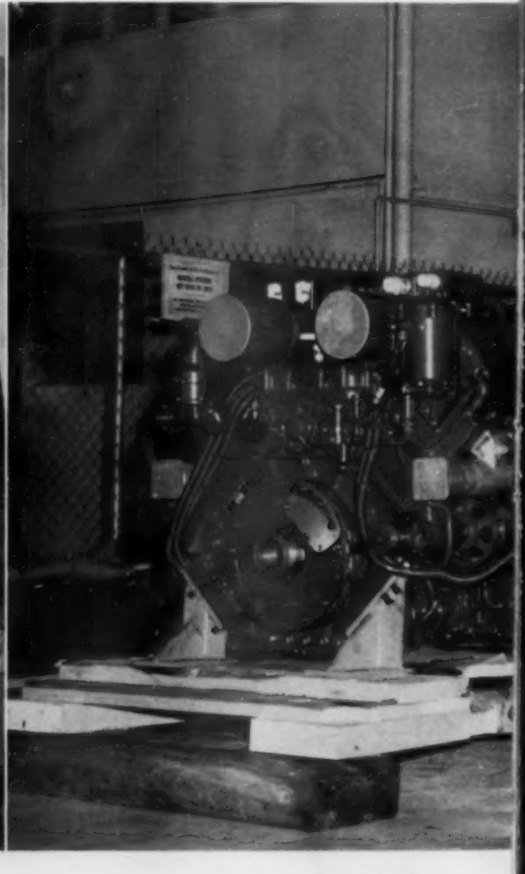
The Robert Bosch electrical equipment is of the 24 volt type and includes generator, starting motor plus the glow-plug starting system and an electric motor to drive the pre-start lubricating oil pump. Upon pressing the engine starter the lubricating oil pump starts first, the regular engine starter will not engage until full oil pressure is established in the lubricating system. In conjunction with the pressure lube oil system for the entire engine there are three service pumps in addition to the prestart pump which incidently could also be used in an emergency as a service pump. Operating on the dry sump system, there are two stripping pumps, one for each end of the oil pan to carry off the oil regardless of the position of the engine. This dry sump lubricating system allows the engine to be operated at angles up to 35 degrees. The lubricating oil pumps have their own gear drive below the crankshaft and the complete assembly is totally enclosed and vented. In the "V" between the cylinders is the eight barrel fuel injection pump made by the Robert Bosch Corporation.

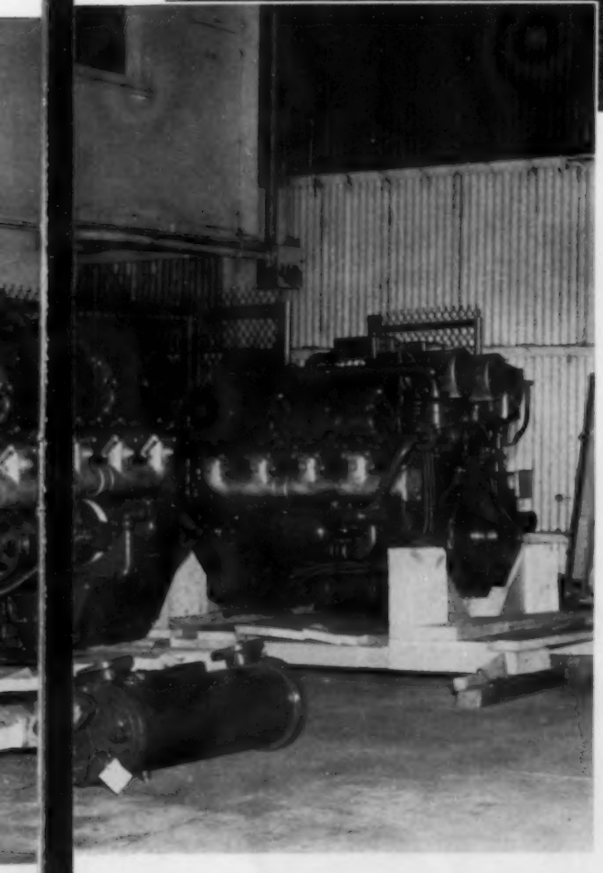
The governor is an integral part of the fuel oil pump. There is also an automatic timing arrangement which advances the time of fuel injection as the engine speeds up and retards it as

The new model MB837-A Mercedes Benz diesels have a continuous bhp of 400 at 1800 rpm and an intermittant bhp of 451 at 2000 rpm. They are 8 cyl 4 cycle "V" type diesels with a bore and stroke of 6½" x 6⅞". Installation was made at Merrill Stevens Shipyard. Allied Marine are the new South Florida distributors for these diesels.



The two model MB837-A Mercedes Benz diesel engines in the boat shed of Merrill Stevens Drydock, Miami, Florida. These engines are rated 451 hp at 2000 rpm. Note the heat exchanger, on the floor, next to the engine.





The 50 ft *Elda* owned by Arthur V. Davis during its trial runs in Government Cut at Miami Florida. Propulsion for the repowered yacht is provided by a pair of model MB837-A Mercedes Benz 451 hp diesel engines. With the new power plant the yacht maintains a comfortable cruising speed of 22 knots and a top speed of 26 knots. Capt. Voss is at the controls.

the speed is decreased. A hand operated fuel priming pump plus a fuel filter is in the fuel oil system and attached to the engine. A closed fresh water cooling system is used and the temperature is thermostatically controlled. This system is both compact and of the utmost simplicity. A gear driven centrifugal type circulating pump and the lube oil heat exchanger are on the side of the engine. Access to all moving parts of the engine is quite simple and every external accessory can be removed quickly and easily. And since the engine is primarily of aluminum alloy, there are very few heavy parts.

As this is one of the first installations of its kind in this country, the engine accessories were made at the plant in Germany. In the future all Mercedes Benz engines will be converted to the use of domestic accessories which will simplify parts procurement and service work. This conversion will be done at the plant of the Utica Division of Curtiss-Wright Corp.

Each engine turns a 25x31 three blade propeller through a Watson-Flagg 1.5:1 "V" drive giving the *Elda* a top speed of 26 knots at 2000 rpm and a cruising speed of 22 knots at 1800 rpm. Fuel consumption is approximately 36 gal per hr for both engines as compared to 50 gals per hr for the old gasoline engines. The fuel tanks have a capacity of 1100 gallons. The original Maxim exhaust silencers are being used with this new installation.

Besides the roomy salon, which has a couch that opens into a bed for two, the craft has a forward cabin with two bunks and a head, complete galley facilities and a large private dressing and bath room. The open cockpit and deck room provide ample space for outdoor living and fishing. Equipment includes a Bendix automatic pilot, a White compass, Sur-Echo fathometer, Panish Positrol controls and an R.C.A. ship to shore radio telephone. Mr. Davis plans to cruise the newly dieselized *Elda* in the sub tropical waters of Florida and the Bahama Islands.

PUT BOTH ENDS OF THE CRANKSHAFT TO WORK

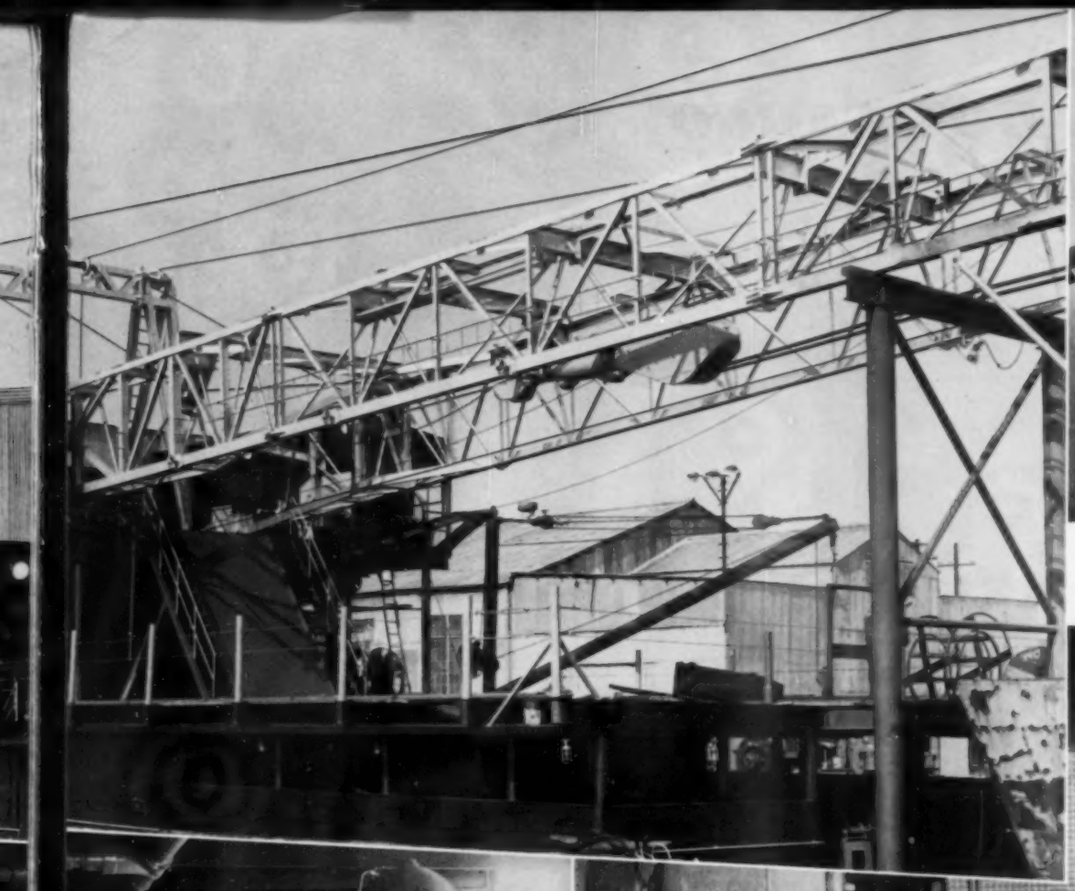
USERS of diesels frequently have need for both mechanical and electrical energy. In the past, the most common solution to this problem was the use of two separate diesel engines, one driving a generator, the other transmitting energy through a power take off. This however was expensive. Some manufacturers have used special generators requiring special shafts which take power only from the flywheel end of the engine. This is usually expensive, uses uncommon parts and is sometimes difficult to service. Of recent note is the announcement of the Caterpillar Hp-Kw Power Unit that takes mechanical energy from the rear of the engine and produces electricity through a front mounted generator. This unit is on a common base with base mounted fuel tank. The arrangement was first shown at the National Sand and Gravel Show and the subsequent Crushed Stone Association Exhibit, both in Chicago last Feburary. Even though this was the first showing of such a unit by Caterpillar, the principal of "two-handed" operation is not new to Caterpillar. Installations many years old have proven that torsional loads are overcome by such things as a rigid block, a heavy-duty crankshaft and large bearings.

Some example installations that have been in operation for a number of years are: 1. Peter J. Schweitzer Co. of Windom, Minnesota; this Company has two D397s, one at Windom and one at Breckenridge, Minnesota. Each engine is operating a flax straw processing plant, the end production going into cigarette paper. The flywheel end of each D397 drives a hammermill while the front end drives a 150 kw generator which supplies power for the electric motors on separators, screens, blowers and conveyors. Here are two applications that take about 225 hp off the front of an engine or nearly 40% of its intermittent rating. These engines have been working since 1953 with no harmful effects. 2. Jay W. Craig Co. of Minneapolis, Minnesota; this construction company put a 40 kw generator on the front of a Cat D13000 over three years ago. The mechanical drive powers a crusher on a Diamond Plant while the generator supplies power to electric motors on conveyors, screens and elevating wheel. The installation has been very satisfactory.

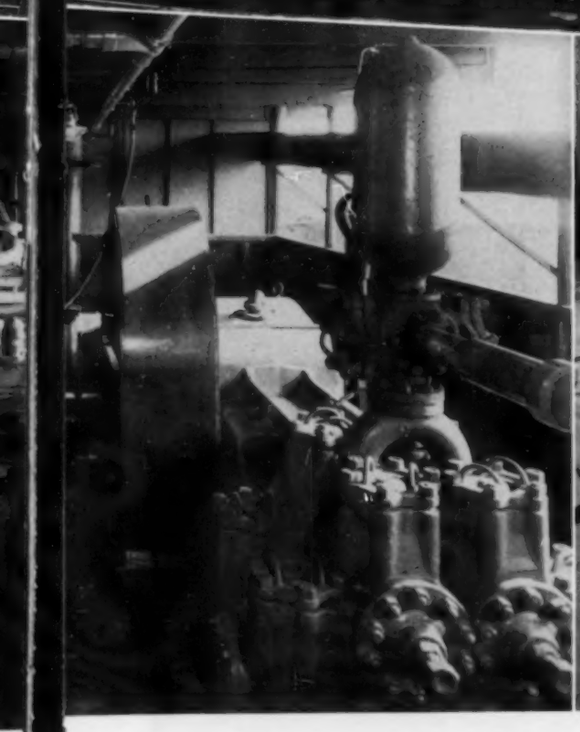
3. Allen Ready-Mix Co. of Memphis, Tennessee; This ready-mix concrete firm uses a Cat D375 on their dredge. The flywheel end of the engine powers a Thomas NAHL pump with 10 in. intake and 8 in. outlet. The front of the engine is used to drive a Gardner-Denver 2 in. priming pump thru a V-belt drive to the side. At the very end of the shaft is a 45 kw generator supplying electricity for the hoist, lights and power tools. After two years of operation, this Cat engine has had no maintenance problems. 4. Hector Construction Co. of Caledonia, Minnesota; This company has used a Cat D13000 with a 40 kw generator driven off the front end of the engine to supply power to motors on conveyors, screens and wheel. The flywheel end supplies power direct to a Pioneer Jaw crusher. After two years of successful operation, the owners are well pleased with the results. 5. Roverud Construction Co. of Spring Grove, Minnesota; This construction company uses the flywheel end of a D397 to drive direct a Cedar Rapids Hammermill. The front of the crankshaft gives power through a Falk air-flex coupling to drive a 1200 rpm generator. Through a double shaft arrangement, the end of the shaft is used to drive the radiator fan on a remote mounted radiator. The front mounted generator supplies power to a 100 hp electric motor powering a Universal Jaw crusher in addition to supplying power to screens and conveyors on a Cedar Rapids plant. The owners are so well satisfied that they have recently purchased a Caterpillar D375 turbocharged engine (continuous rating 325 hp) for another combination drive application.

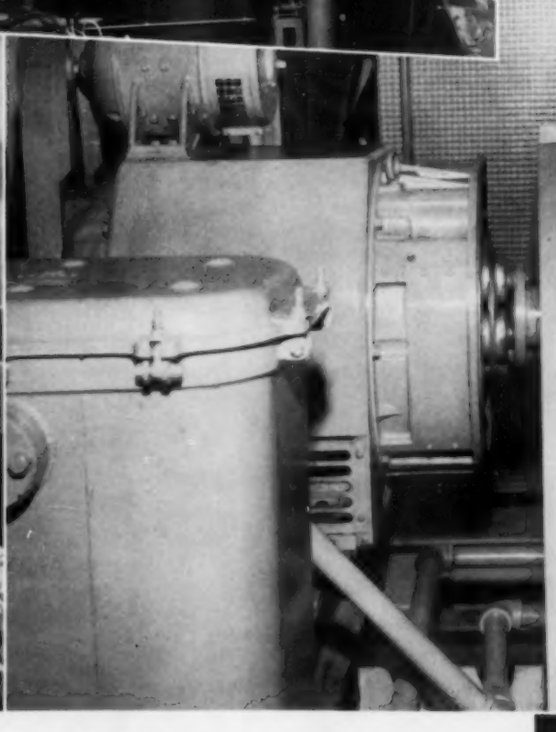
In these highly competitive times, more effective control by electricity coupled with the low initial price of mechanical drive and the portability of the combination unit makes this "two handed" arrangement an industry natural. Use of both ends of the crankshaft gives the flexibility and simplicity needed on many applications today.

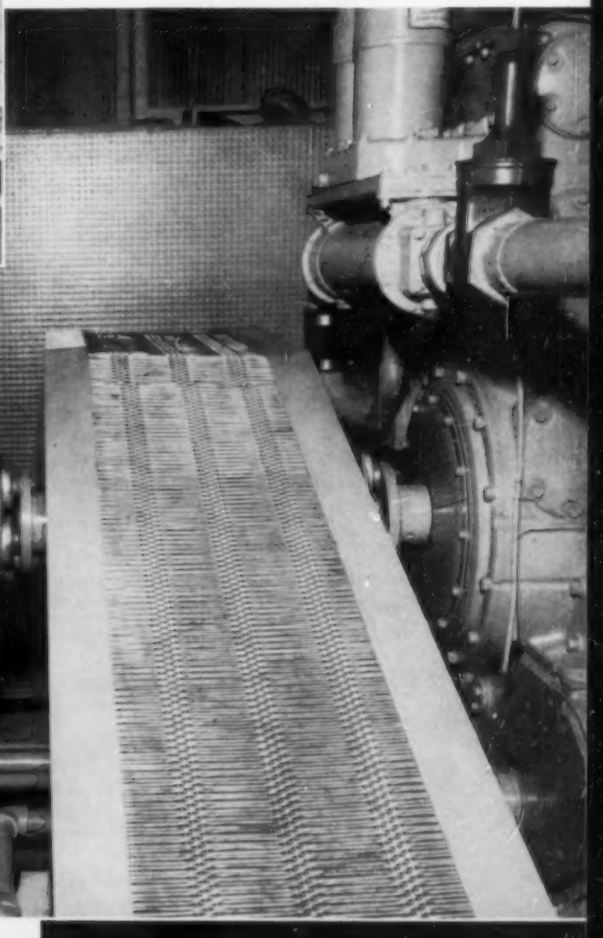
Allen Ready-Mix Concrete Company. Left to right, Bill Allen, son, Sid Allen, Father.



Workover Inc. Rig New Orleans, and above, the Allen-Ready Mix Dredge.

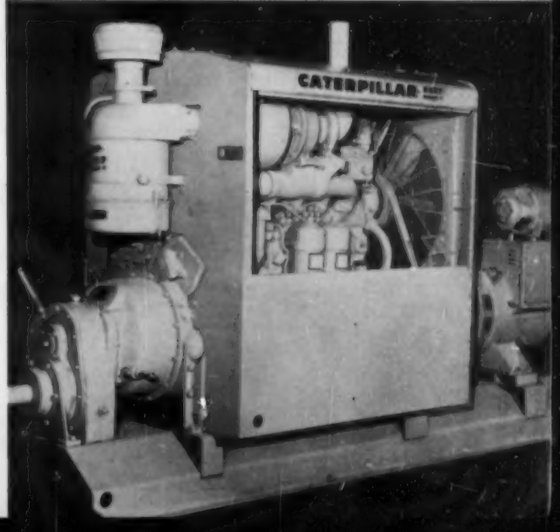






Cat D333 (Series C), Intermittent Rating 340 hp. Owned by Workover Inc.; Rig for working over existing offshore oil wells with capacity and capability of drilling; Primary Power —Three D333 (Power drawworks); Completed construction New Orleans, Louisiana; One Gardner-Denver Pump —One Bethleham Pump. On this application, the pump that is V-belt driven off the front of the engine requires about 160 hp or about 48% of the engine's intermittent rating.

In the foreground, beneath the V-belt drive guard power is taken from a double Universal connected shaft to the side to drive the 2 in. primary pump. To the left of the photo is a 45 kw generator, 220v, that supplies power to the hoist, lights and tools.



This Caterpillar D337 (Series F) engine rated at 310 maximum horsepower takes power off the front and rear of its crankshaft. This particular engine power take-off generator combination mounted on a common base is one of a series of Caterpillar combination drive units available. This combination drive feature is versatile, portable, comparatively inexpensive and easily serviced. It can be utilized on a number of applications.

DIESELS HAUL *HOT CARGO*

By L. H. HOUCK

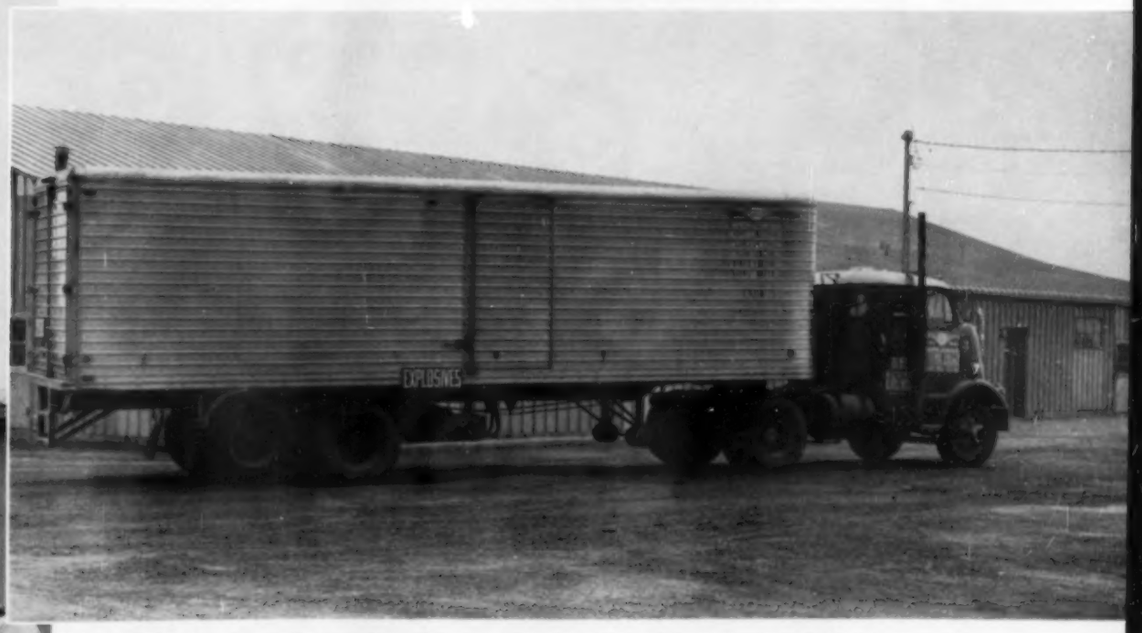
WHO hauls the explosives, the radio-active materials, rocket propellant and missile fuels? You may be sure they don't call John, the drayman, or any other inexperienced, untrained carrier. Untrained handling of dangerous commodities classed as hot cargo could be as dangerous as careless handling and could lead to disaster for truck driver, truck and even whole communities. So it is but natural that such cargoes be entrusted only to those who prepare for it with proper equipment and who train their drivers in handling the hazardous material. While Tri-State Warehousing & Distributing Co., Joplin, Mo., headed by C. Rex Jeans, president, has been hauling explosives since 1900 when they used horses and wagons, they have only recently been granted ICC authority to handle radio-active material. Tri-State uses five of its six diesels, new cab-over GM trucks powered with 6-71 GM diesels, in hauling DuPont explosives from a nearby powder plant to destinations in eight states. These trucks also haul cargoes of rocket propellant, missile fuel and plain explosives as the occasion demands. All drivers are trained for their jobs with orders from C. Rex Jeans to move immediately to protect the public in the case of danger. For instance, if a cargo of dynamite catches fire, the driver is instructed to open the doors if possible so it can burn freely, flag traffic, and notify the police so the public can be kept out of danger. Because of such precautions, as well as the precaution to select good inherently safe diesel equipment, and to keep it in top notch shape, Tri-State has a perfect accident record. A record, incidentally, it intends to keep.

"Diesel engines are inherently much safer than gasoline for this dangerous and specialized business," said Tom Dilworth, treasurer and operations manager of Tri-State. "In the first place diesels are more economical, delivering more miles to the gallon and this reduces the number of stops for refueling. Each refueling is always a hazard and the fewer we have, the less chance of an accident. In addition, with diesel fuel tanks we have less chance of explosion which might detonate a load of dynamite since the diesel fuel usually burns but does not explode like gasoline," Dilworth said. "Our standards for brakes and general maintenance of our over-the-road units are of the highest calibre which reduces the chance for a road failure that might lead to an accident. We take every precaution that we can and our program has paid off in a no accident record and created interest among firms who have hot cargoes to be hauled."

Tri-State is the first trucking firm in the U.S. to be granted a temporary authority to haul atomic energy products by the ICC, pending action on a permanent permit. Up to now all atomic materials were hauled by the Atomic Energy Commission. To qualify to haul radio-active materials from atomic energy installations to scientific and research laboratories throughout the nation, Tri-State put its money into a trailer that looks like any other modern aluminum rig but which conceals 13 tons of lead encased in stainless steel which forms a cask to contain 60 lbs of deadly radio-active material. C. Rex Jeans said their development of a rig to haul the material was purely

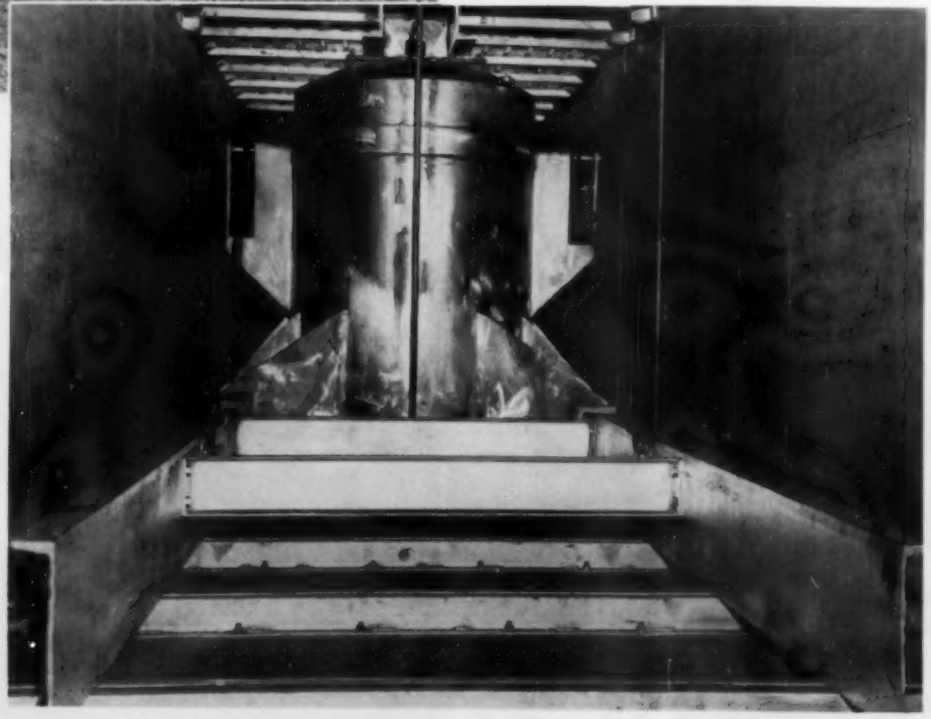
Tri-State is located on U.S. 166, 6 miles east of Joplin, Mo. and is the first truck transportation company to be awarded an ICC permit for hauling radio-active materials. It has been a specialist in explosives transportation since 1900. To the right—Maximum speed limit for the rig hauling atomic materials is 45 mph uphill or down.

One of the six tractor-trailer combinations owned by Tri-State and used for hauling explosives, ammunition, rocket propellant and other explosives. Each unit uses a GMC cab-over diesel tractor with 6-71 GM diesel engine.



experimental and as safe as they could make it. Two of his top drivers, Floyd Malone, who has hauled explosives for 17 years and never scratched a fender, and Leroy Hutchinson, with similar experience, were told of the dangers of the new job and the worst possible things that could happen to them. They don't consider the job any more dangerous than the explosives they have been hauling for years and their training makes certain they will not short-circuit the rules.

Looks like a small load for a high-cube trailer but this stainless steel encased lead cask weighs 13 tons. It contains only 60 lbs of payload—radio-active material from Idaho. The cask is lashed to a special frame of welded steel beams.



Present atomic cargoes are loaded at the atomic reactor at Arco, Idaho, and are hauled all over the nation. Here's the interesting routine. When an order is received to go to Idaho for a load, the two drivers file a route plan with the company's safety director, E. T. Kersch, who has previously driven every mile of the route, inspecting bridges, highways through towns, construction jobs, with routes to bypass, all laid out. The GMC cab-over diesel, pulling the special trailer and the hot pot moves out on precise schedule. The cab is equipped with sleeper, radio and the truck moves 24 hours a day. A driver sleeps four hours and drives four hours. The company has its own speed law which is a maximum of 45 mph. President Jeans said this speed is not exceeded even on down grades. Each driver wears a film badge to detect radio-activity and every two hours the truck is stopped and checked for radio-activity with a Gieger counter.

"Readings are taken every two hours from outside the trailer at four different points," Jeans said. "In this manner we are able to tell if there has been any change in the level of radiation."

Once each 24 hours the trailer is opened and the cask visually inspected as to its fastening in the trailer and surface readings are taken again. Jeans said the system was their own and that it had not been required by anybody but that they had developed it for their own protection, for their insurance coverage and for the protection of the public. Extra precautions are taken to avoid the chance of a disaster that might lead to hampering rules and laws which would make the transportation of hot cargoes difficult. Successful and safe transportation is certain to lead to more shipments of fissionable materials and make it easier for firms and laboratories to acquire it, according to Jeans. For example, the petroleum industry is using fissionable material in a search for better lubricants and for irradiating piston rings to make such tests possible.

NAPIER *GAZELLE* FREE TURBINE ENGINE

By R. TOM SAWYER

THE Napier Gazelle free turbine engine was primarily designed for varied applications such as power plants for Helicopters, Airplanes, generating sets, pump and compressor drives, in fact all areas where low space and weight are essential.

The Gazelle in the industrial and marine version is rated at 750/1000 bhp continuous dependent upon the duty and type of operating conditions. In particular it is well engineered for mobile and portable applications. For further data see Table I immediately below.

Table I

Leading Particulars and Performance Gazelle Mark N Ga #1 for Industrial, Marine and Mobile Uses.

Diameter	35.5 ins.
Length	70 ins.
Weight	900 lbs
Fuel	Kerosene, JP1, JP4 or JP5.
Fuel consumption at continuous rating and ambiant temperature of 110°F.	0.77 lbs/SHP/hr
Oil Consumption	1.0 lb/hr
Maximum rating	1260 SHP
Continuous rating	920 SHP
Maximum output shaft speed	3300 RPM
Compressor RPM sea level.	19,000 RPM

The engine is particularly adaptable for restricted or awkward space installations because of the ability to mount the engine anywhere between the horizontal and vertical. Engines of either left or right hand rotation of the output coupling are available. The standard production engine has built in protective devices both in the control system and also the individual components which give maximum safety of operation.

This versatile engine has the torque characteristics inherent in the free power turbine concept which greatly ease transmission requirements. Likewise the steep drop in engine vibration by using the turbine reduces the number and magnitude of problems normally associated with the reciprocating engine. Also the Gazelle has the designed capability of catering for sudden load changes.

In the thermal efficiency sense the Gazelle is a good performer having a commendably low specific consumption through a wide range of fuels. The Gazelle weight and dimensions automatically place it in a highly acceptable category for industrial and marine duty. Equally the built in durability and quick maintenance features make it a very interesting and economically attractive power plant.

Turbine Details

AIR INTAKE: Air enters the compressor through a radial intake cast in Magnesium Alloy (DTD. 748). This is clearly shown at the bottom of turbine on test, see Fig. 1. The intake provides a mounting for the engine accessories shown in Fig. 2. This also houses the variable inlet guide vanes. Protection against icing of the intake is provided by oil heated jackets, and the inlet guide vanes are anti-iced by passing hot air bled from the compressor through them.

COMPRESSOR: The 11-stage axial flow compressor shown in Fig. 3 has a constant outside diameter

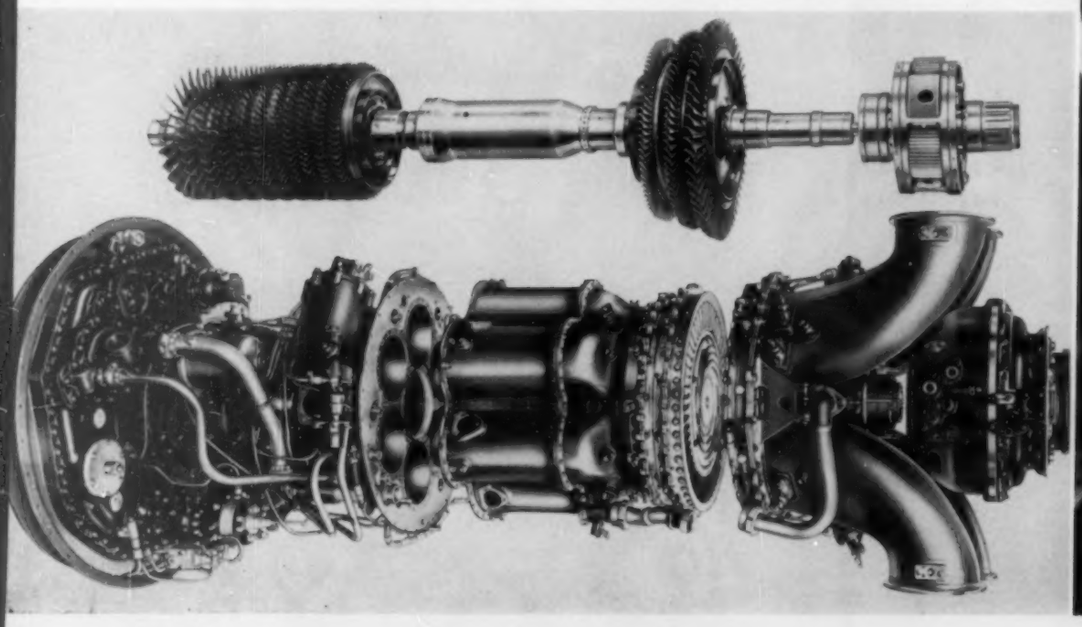


Fig. 3. Exploded view of the Napier Gazelle Free Turbine Engine.

and supplies an air flow of approximately 16 lb per second at a pressure ratio of 6.37 to 1 at the emergency rating. The compressor gives optimum efficiencies which are well removed from surge throughout the entire speed range. At low engine speeds this margin from surge is further increased by the use of variable incidence angle inlet guide vanes controlled by a speed sensing servo unit. Compressor stator blading is of Aluminum Bronze (DNS 210), a material which combines high fatigue strength with excellent corrosion resistance. All the rotor blades are secured by fir tree roots to the compressor discs which, from stages two to seven are of aluminum (DNS 211), and the remainder are of steel (DNS 116–REX 448). The compressor casing of ZT 1 Magnesium-Zirconium

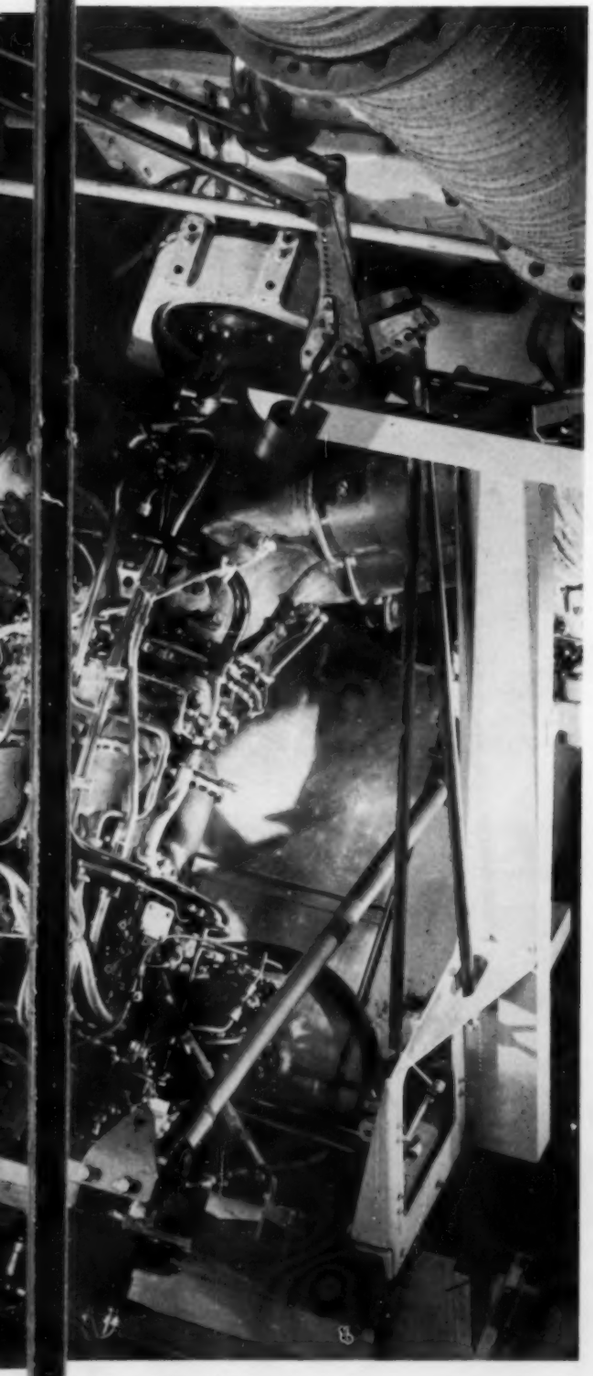


Fig. 2. Air intake showing inlet guide vanes and accessories.

Alloy, carries the stator blading, the first three stages of which are shrouded. A roller bearing, situated in the air inlet casing, and a ball bearing within the main support plate, carry the hollow steel (S 106) splined shaft.

SUPPORT PLATE: The support plate is the structural foundation of the engine, having the compressor casing bolted to its lower face and the outer casing of the combustion system secured to its upper face. The casting is of ZT.1. Magnesium Alloy with four engine mounting pads cast integrally. The air delivered by the compressor passes through a delivery annulus and is diffused by six divergent ducts, leading to the combustion chambers.

COMBUSTION SYSTEM: The combustion system consists of a fabricated outer casing on Nimonic 75, containing six flame tubes of the same material shown in Fig. 3. The six upstream burners are cooled by dilutionary air trapped in a shroud between the flame tube and casing and can be individually removed without disturbing other components. The use of upstream burners has allowed a considerable shortening of the combustion system to be made with a consequent saving in weight. Two high energy spark plugs are used to ignite the mixture on starting, and interconnector tubes between adjacent chambers ensure flame propagation and pressure balance. The engine operates satisfactorily on either kerosene or wide-cut fuels.

TURBINE: The compressor turbine comprises two rotor discs of REX 448 steel splined on a hollow shaft forged from S. 106 steel and carried on a deep groove ball bearing. The turbine drives the compressor through internal gear-tooth splines on the turbine shaft engaging with a coupling splined to the compressor shaft. See Figure 3. The rotor blades are of Nimonic 100 in stage one and Nimonic 90 in stage two, being secured by fir tree roots and special locking tabs to the discs. A limited amount of blade tip rock is permitted to relieve blade root stresses arising from differential expansion of the blades and discs; a Nimonic lacing wire running through the blade roots provides vibration damping. The inter-stage ring between the first and second stage rotor discs is of S. 80 steel and is located on the shaft by a small diameter peg. After the second stage rotor disc a balancing disc incorporating screwed plugs is provided for the final dynamic balancing of the rotor assembly. Scroll-type deflectors on the interstage sealing assemblies control the passage of cooling air across the faces of the turbine discs. A balance piston splined to the shaft before the first stage rotor limits the axial loading on the bearing imposed by the turbine thrust. The first stage nozzle blading is cast in X. 40 steel and locked in slots on the inner and outer rings. The second and third stage nozzles have inner and outer platforms and are bolted to the external casing. A swinging link attachment on several of the inner platforms carries the interstage seal plate allowing differential

Fig. 1. Gazelle unit on test. It can operate at any angle between horizontal and vertical.

expansion and maintaining concentricity of the seals under all conditions.

Mounted co-axially with, but mechanically independent of, the compressor turbine is the free power turbine, which is coupled to the output shaft through epicyclic gearing. The power turbine is clearly shown in Fig. 3. The forged power turbine disc is integral with a hollow shaft carried on one ball and one roller bearing. The blading is similar to that on the second stage rotor blades of the compressor turbine. A splined quill shaft engaging on internal splines in the turbine shaft transmits the drive to the reduction gearing.

REDUCTION GEAR: Because of the construction of the torquemeter shown in Fig. 3 the gearing is not mechanically fixed to the casing; this reduces vibration to a minimum and improves transmission efficiency. A toothed stationary coupling on the magnesium reduction gear housing is provided to transmit the engine torque to the airframe. From the turbine, power is transmitted through a quill shaft to a high-speed input pinion supported at the rear end by a ball bearing and, at the front, by a roller bearing. The pinion drives three planet gears, the layshaft of each being mounted on two roller bearings and carrying a planet meshed with the internal annulus gear. The planet gear and layshaft assembly is carried on roller bearings in a carrier which is integral with the output shaft. The carrier is supported at the front end by a roller bearing and at the rear end by a ball bearing.

TORQUEMETER: The torquemeter, which is mounted in the reduction gear casing, consists of an annulus gear and a torque ring, each having fifteen vanes carrying spring-loaded seals. The annulus gear is located inside the torque ring so that the vanes on each are interposed and spring-loaded against the annular walls between the opposite members by the seals. The spaces between the vanes form the high and low pressure chambers of the torquemeter and allow peripheral movement of the annulus gear. During normal operation, oil is supplied by a high pressure pump through inlet ports to the high pressure chambers, and leaks across the sides of the vanes to fill the low pressure chambers. The high and low pressure chambers are separately interconnected by annular passages, and drain oil escapes through exhaust ports in the torque ring front cover to the engine sump. As the torque increases on the annulus gear, the vanes move in relation to those on the torque ring, increasing the inlet port area, and thereby increasing the oil pressure in the high pressure chambers until the pressure is sufficient to balance the torque. Movement of the annulus gear also enlarges the exhaust port area to facilitate drainage of the now greater leakage of oil from the low pressure chambers. By suitable connections to the pressure balancing chambers the torquemeter is used to give signals for operating safety devices in the event of component failure.

Engine tests have consistently shown that the accuracy of the torquemeter over the normal power range is within $\pm 1\%$ of the calibrated dynamometer readings.

Engine Cooling, Pressure Balancing and Sealing

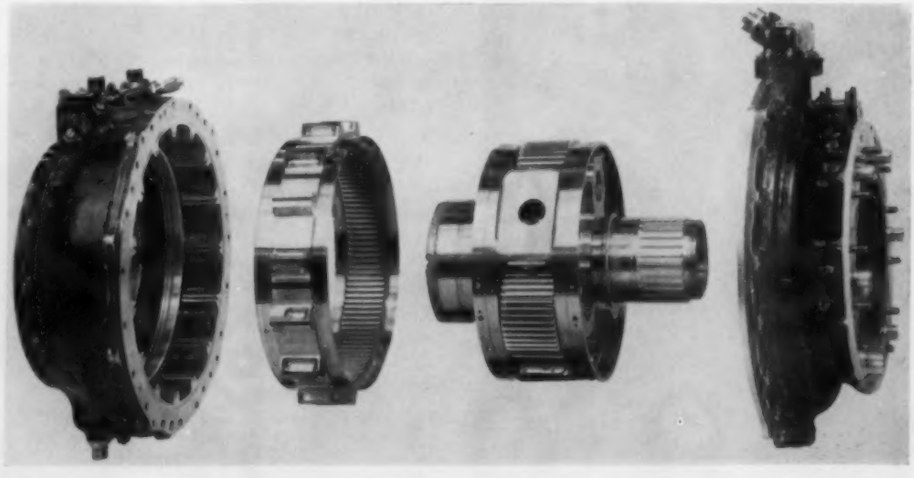
Air is bled from the compressor to cool the turbine, to pressurize the balance pistons and bearing seals and to protect the compressor inlet guide vanes from icing. The front face of the first stage turbine rotor is cooled by air tapped from the support plate. This air passes through an annulus at the outer diameter of the balance piston assembly, pressurizes the balance piston and then through a small clearance between the seal plate and the hub of the balance piston, flows across the front face of the first stage disc, through a scroll. The object of the scroll is to lengthen the path of the cooling air across the face of the disc. Further air is tapped from the tenth stage of the compressor and passes into the hollow shaft through an air transfer shroud carried at the inner diameter of the stator blading. This air, which passes through scrolls on the inter-stage seal plates, cools the rear face of the stage one disc, both faces of stage two disc, and the front face of the free turbine disc. The power turbine bearing and the rear face of the last stage disc are cooled in series with air taken externally through a pipe and filter from stage six of the compressor. Tappings from this filtered supply also cool and pressurize the seals of the compressor delivery end bearing and the compressor turbine bearing. To heat the inlet guide vanes, air is taken externally from the compressor delivery. Stage four is also tapped to supply air, through the hollow compressor shaft, to the compressor balance piston and to pressurize the compressor inlet bearing seals.

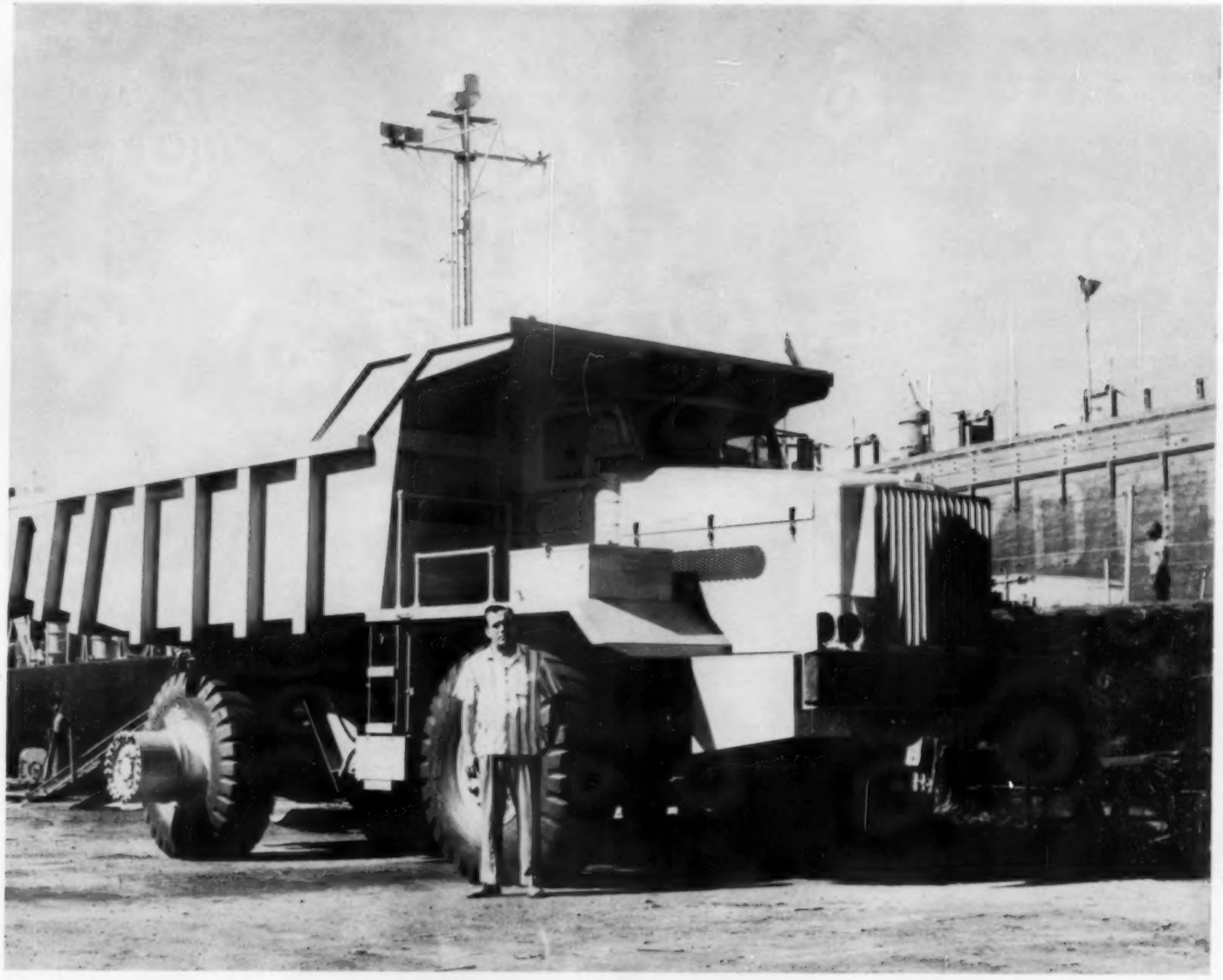
ACCESSORIES: The engine accessories shown in Fig. 2, comprising the electric starter, oil pumps, tachometer generator, speed sensing unit, centrifugal breather, oil cooler fan and fuel pump, are mounted on the air intake and disposed around the compressor.

LUBRICATION SYSTEM: Lubrication is on the dry sump principle, and the system has been designed to function satisfactorily in any installation position between vertical and horizontal. The engine is supplied with oil from a gear-type pressure pump at 80 psi which, through a filter, delivers oil to the bearings, gears and torquemeter pump. The pressure pump incorporates a relief valve which by-passes excess oil and a static head valve, situated between the pump and filter prevents flooding of the engine by oil under shutdown conditions. Oil passing through the filter into the oil feed gallery is fed through static head valves to the compressor delivery bearing, the compressor turbine bearings and the front bearing of the free turbine. From the feed gallery, oil is also supplied for the lubrication of the reduction gearing through sparge-type jets on the planet carrier, and a metered feed provides lubrication to the rear bearing of the free turbine, the output shaft coupling splines and the reduction gear bearings. The compressor intake bearings and the accessory bearings and gears are lubricated by oil taken from the intake side of the torquemeter pump. Scavenge pumps are provided for the scavenging of the turbine and compressor bearings, feeding the oil to the auxiliary sump on the front face of the air intake casing. The oil is then transferred to the main sump on the free turbine casing and after passing through a strainer and the anti-icing jackets in the air intake, is returned via the main scavenge pump to the system.

CONTROL: A single lever operating in a Napier fuel metering unit is the only engine control for normal running; a second lever is required to dump the fuel. A Lucas variable-stroke pump supplies fuel to the metering unit, automatic compensation of the flow for changes in ambient temperature and pressure conditions is provided by the unit, thus obviating any need for repeated control adjustments by the pilot. During acceleration the variable datum turbine inlet temperature and acceleration controls prevent over-fueling which might result in surge of the compressor, and a control, responsive to engine speed, varies the compressor inlet guide vane setting. This enables the engine to accelerate rapidly, and "slam" accelerations can be made. Should transmission failure occur, over-speeding of the free turbine is prevented by low positive torque signals from the torquemeter causing the fuel metering unit to cut off the fuel supply to the engine immediately.

Fig. 4. Reduction gear and torquemeter.





The Oshkosh 28 ton end dump truck powered by a 300 hp Cummins diesel and Allison torque converter before being loaded onto the deck of the MV *Inagua Arrow* in Miami bound for Cuba.

A PAUL BUNYON TEST

By ED DENNIS

AN actual down to earth working test is being conducted with several extra heavy, off the highway, dieselized, trucks by the Cuban American Nichol Co. and the Moa Bay Mining Co. in Cuba.

Both firms are connected with the Freeport Sulphur Company. Several American mining companies, with the blessings of the Cuban government, are helping to build up Cuba's mining industry. At present mining is Cuba's fastest growing industry. Exports jumped from 12 million dollars to 34 million dollars in 1956 and when the figures are computed soon, the 1957-58 total is expected to be way out ahead of anything ever dreamed of.

Two of the huge, off the highway dieselized trucks which were shipped on the M. V. *Inagua Arrow* from Miami Florida recently, are an Oshkosh 28 ton end dump truck and a 26 cu yd Mack. Specifications on the 6 wheel Oshkosh truck included a model NHRBS 6 cyl supercharged Cummins diesel, rated 300 hp at 2100 rpm, Allison single stage 3 phase torque converter along with an Allison, number 602, planetary gear transmission.

For power on the 10 wheel Mack, a model NHR-IS turbocharged Cummins, rated 300 hp at 2100 rpm with an Allison torque converter, a Bendix Westinghouse air compressor and Donaldson air filters. The overall length is 30 feet and width 12 feet. The firm's plans to standardize their future purchases of heavy duty dieselized equipment, and the outcome of these tests, will decide which type and make of machinery will make up their future fleets.

Second Dravo-3200 towboat to enter service is the *Crescent City*, built by Dravo Corporation and owned by Sioux City & New Orleans Barge Lines, Inc., of Houston, Texas. The 148-foot diesel vessel is designed for high speed operation of integrated tows or precise maneuvering of maximum size loads.

M/V *CRESCENT CITY*

A SECOND Dravo-3200 diesel towboat has entered service on the Mississippi River system. The *Crescent City*, one of three similar 3200-hp vessels built by Dravo Corporation, Pittsburgh, was delivered recently to Sioux City & New Orleans Barge Lines, Inc., of Houston, Texas. The third of these high-speed maneuverable boats will be ready for delivery late this month.

One of the fastest and most powerful towboats of its type on the inland waterways, the *Crescent City* is 148 ft long, 34 ft wide and 10½ ft deep. She is powered by two Cleveland Diesel model 16-567C marine engines, each capable of delivering 1600 shaft horsepower at a propeller speed of 212 rpm. The vessel, which will operate primarily on the Mississippi River between New Orleans and St. Louis, joins four other towboats in the Sioux City fleet—the 1800-hp *Sioux City*, the 3200-hp *Kansas City*, the 1800-hp *Omaha* and the 1000-hp combination tug-towboat *Waverly*.

Scientific design of the hull, rudders and Kort nozzles, developed as the result of Dravo's continuing research and model basin tests, enable the *Crescent City* to push either maximum size, heavy tonnage tows or streamlined high speed tows with equal efficiency. In trial runs, these boats have moved 20 barges loaded with 18,000 tons of coal at speeds in excess of 6 miles an hour and an integrated 8500-ton petroleum tow at almost 13 miles an hour. The *Sally Polk*, first Dravo-3200 to be put into commercial use, has pushed a 17,000-ton, 100-foot-wide petroleum tow at 9 miles an hour pool speed. Superstructure of the *Crescent City* includes a main deckhouse, upper deckhouse and pilothouse. The all-electric galley, messroom and quarters and lounge for the crew are in the main deckhouse. The upper deckhouse contains quarters and lounge for officers and guests. In the pilothouse are all operating controls, including such modern navigational aids as radar and ship-to-shore telephone. Interio. vaneling is plywood to reduce the sound level.

The *Crescent City* has two steering gear systems, one for flanking and one for steering ahead. Steering engines are located above deck level for easier access. Each system consists of a double-ended hydraulic ram, steering control valves and control and follow-up mechanism. Both rams are connected to a common hydraulic accumulator and pump. A second pump cuts in automatically when pressure falls to approximately 75 psi below operating level. Steering is controlled from the pilothouse console by means of push rods running to the steering compartment. Through the follow-up system, the rudders remain at the same angle as the levers in the pilothouse, giving the pilot a constant indication of rudder positions. Six streamlined, balanced rudders control the vessel's course. One is aft of each propeller for steering ahead and two forward of each propeller for flanking. The four-bladed propellers are 8 ft, 6 in. in diameter, and made of high tensile, stainless steel. Their pitch, area and blade form have been designed by Dravo for use with the Dravo Kort nozzle. Just forward of each propeller is a single-armed streamlined steel strut which supports the propeller shaft. Both propellers rotate inboard for ahead propulsion. Each compartment can be emptied by the fire and bilge pump through a bilge manifold located in the forward engine room. An auxiliary bilge suction system in the engine room operates from the cooling system raw water pump on one engine. Check plugs in the bilge manifold prevent bilge water from flowing when pumping through the fire main. The fire pump gets its suction from the main injection header.

Taking their suction from the injection pipe, the engine-driven raw water pumps discharge to the jacket water cooler. Most of the discharge is carried overboard from the heat exchanger, except for some raw water which is by-passed to the gear lube oil cooler and then to the stern tube to lubricate the strut bearing. The *Crescent City* is equipped with the most modern navigation equipment, including radar, ship-to-shore radio, a teletalk system, an airhorn and a 16-inch steamboat bell with electrically-operated clapper. Two 19-in., 45 amp electrically operated carbon arc

Pilothouse of the 3200-horsepower towboat *Crescent City* is designed for maximum visibility and is equipped with all modern navigational aids, including radar and ship-to-shore telephone.

searchlights are mounted on the pilothouse roof. Two 500-watt incandescent floodlights are provided on the after end, one port and one starboard. Navigation lights include two side lights, push towing lights for above and below the Huey Long Bridge, and two range lights, all controlled by a seven circuit, tell-tale panel located near the pilothouse control console. A boat crane of two-ton lifting capacity is located aft on the roof of the main deckhouse.

In addition to the combination fire and bilge pump, fire-fighting equipment includes: one 35-pound CO_2 cylinder and a locally controlled hose reel with 50 feet of hose in the engine room; four 15-pound CO_2 portable hand type extinguishers; six 2½-gallon foam type extinguishers. An oil-fired boiler generates steam for hot air heaters. Hot air is forced through ducts to all living quarters, showers and mess room. Unit heaters are also located in the pilothouse, lower engine room, forward hold compartment, rope locker and steering compartment. The galley is equipped with an electric range with oven, a stainless steel-topped sink, a 54-cubic-foot reach-in refrigerator, a nine-cubic-foot night service refrigerator and an 18-cubic-foot deep freezer. The mess room and galley are located aft of the engine room in the main deckhouse, the mess room on the port side and the galley on the starboard side. Quarters for the maid and cook are located just forward of the galley.

Principal Equipment

Main Engines	Model #16-567C General Motors Corporation
Reverse and Reduction Gears	Falk
Governors	Marquette
Air Compressors	Gardner-Denver
Air Filters	Air-Maze
Lube Oil Filters	Briggs
Lube Oil Strainers	Cuno
Shell & Tube Jacket Water Coolers & Lube Oil Coolers	Ross Div.
Generator Units	Detroit Diesels with Delco Generators
Switchboard	Lake Shore Electric

Propulsive power for the towboat *Crescent City* is supplied by two Cleveland diesel marine engines, each capable of delivering 1600 shaft horsepower. The second 3200 class boat built by Dravo Corporation, she has entered service for Sioux City & New Orleans Barge Lines, Inc., of Houston, Texas. *Note* Air-Maze filters and Marquette Governors.

DIESEL SERVICE PROGRESS

A COMMENTARY BY **GEORGE R. MACKEY**

George R. Mackey was long associated with Detroit Diesel Engine Division of General Motors Corp., and had prior experience as a mechanic in Europe and the U.S.A., which enabled him to become well acquainted in the diesel and service fields and to obtain a broad scope of the service industry from the customer's and management's viewpoint. Further training at Carnegie Tech and in the Army Ordnance during World War II provided the necessary requirements in planning service programs. Progressive advancement in diesel service areas in General Motors and with Detroit Diesel led to his position as Supervisor of Service Promotion. Upon termination of employment with General Motors in 1952, he joined Clayton Manufacturing Company, and his present position with this organization is Sales Manager of the Dynamometer Division.

Service Management

The Importance of Service

ONE of the first things to consider in any business involving the performance or sales of engines and equipment is the important role of the Service Department. Regardless of the type of business, whether it is an engine or equipment distributorship, a large contractor or fleet operation, the Service Department has definite responsibilities which it must carry out. In a retail service operation, such as we find in an engine or equipment distributor's establishment, the Service Department's responsibilities are aimed towards satisfying the needs of the customer, and to perform those services that will influence a customer in his future purchases. In a contractor's or fleet's operation, the Service Department's responsibilities are to safeguard the investment in equipment by maintaining the equipment's ability to perform so that production schedules can be maintained. All of these responsibilities must be fulfilled as economically as possible, with practical forethought to set up procedures for extending the life of the equipment to its utmost. In a distributor's organization, service backs up the sales. We can readily recognize that without sales there would be no need for service. But quite often organizations overlook the fact that without the right kind of service, sales will be adversely affected. In other words, sales and service go hand in hand and one must support the other. Service must receive equal planning with sales programs and it must be recognized as a definite part of a successful business—not a necessary evil. In a slightly different manner, the same things are equally true in a contractor's or fleet's operation. Here the chief interest is in production. Without production there would be no need for service and without a planned service program, production would be seriously affected, if not eventually brought to a complete standstill. By visualizing these conditions, we can very easily evaluate the importance of a Service Department, and the need of capable management to plan and direct the operation of the Service Department towards fulfilling its many responsibilities.

The Service Manager's Job

The direction of the Service Department and the leadership of its personnel is the job of the Service Manager. He is appointed because of his background, training and capabilities, to help his organization operate successfully and make a profit. While the Service Manager in a fleet operation must protect his company's investment in equipment by keeping it in good repair so that by good performance production schedules can be assured, the distributor's Service Manager must protect the customer's investment in equipment by keeping him satisfied with its performance. Through such treatment, the customer gains confidence in the distributorship and becomes a repeat buyer. Besides protecting the customer, the Service Manager cannot overlook his greatest obligation, that of helping his distributor make a profit. This can only be done if the Service Department operates efficiently, is self-supporting, and strives to maintain the reputation of both the distributor and the products he represents. To operate efficiently, a Service Department must make money for the distributor by obtaining its full share of repair business and by planning a steady flow of work to keep employees busy at all times. The fleet Service Department operates efficiently when its maintenance costs are kept within a planned budget and productivity is maintained at its maximum level. While we have covered the relationship between sales and service, or productivity and service, and the important role a Service Manager plays in leading his department to the fulfillment of its responsibility, we must determine what is good management and what the Service Manager's duties are.

What Is Good Management

Good management is the skill and ability to organize physical equipment and personnel, and to direct and employ them so that the full objectives of the business are accomplished. By physical equipment, we must consider such things as space, machine equipment, special tools and all other physical properties of the place of business. Only by applying one of these definitions to the daily operation of the Service Department, by thinking and planning for the future, and by continuously investigating for improved methods and practices can the modern Service Manager effectively fulfill his principal responsibilities. Good management then can be simply defined as: (1) knowing how to deal with people (both customers and employees); (2) making efficient use of service facilities; and (3) for the retail service operation to plan effective merchandising methods.

What Are the Duties of A Service Manager

To list all of the duties for Service Managers of all types of service would be almost impossible, and regardless of how long the list might be, certain items that are important to some types of business would not be covered. However, there are certain duties that will be found common to Service Managers of retail operations and fleet operations.

These duties would include: 1. Satisfy customers in a retail operation. 2. Make a profit in a retail operation. 3. Hold complaints to a minimum. 4. Control expenses. 5. Increase labor sales in a retail operation. 6. Improve department productivity. 7. Direct work of employees. 8. Run shop efficiently. 9. Hold service meetings. 10. Fill out and check repair orders. 11. Handle time tickets. 12. Keep service and maintenance records. 13. Select and install new equipment. 14. Recondition or replace worn out equipment. 15. To plan educational programs. 16. Run a clean shop. 17. Operate a safe shop.

These duties, and numerous others that could be added, must be considered as a Service Manager's responsibilities, both by the Service Manager and higher management. Futhermore, the Service Manager cannot perform his duties satisfactorily if he does not have the authority to carry out his responsibilities. The responsibilities which rest on the average Service Manager of today are far greater than ever before. And greater than ever are the opportunities for greater success and progress. The successful Service Manager is easily distinguished for many reasons. (1) He accepts full responsibility for the performance of his duties. (2) He has a clear understanding of his job and his duties. (3) He is a man who has a great many responsibilities, but will not shirk from additional ones if they are worthwhile.

NEW ALCO FACILITIES

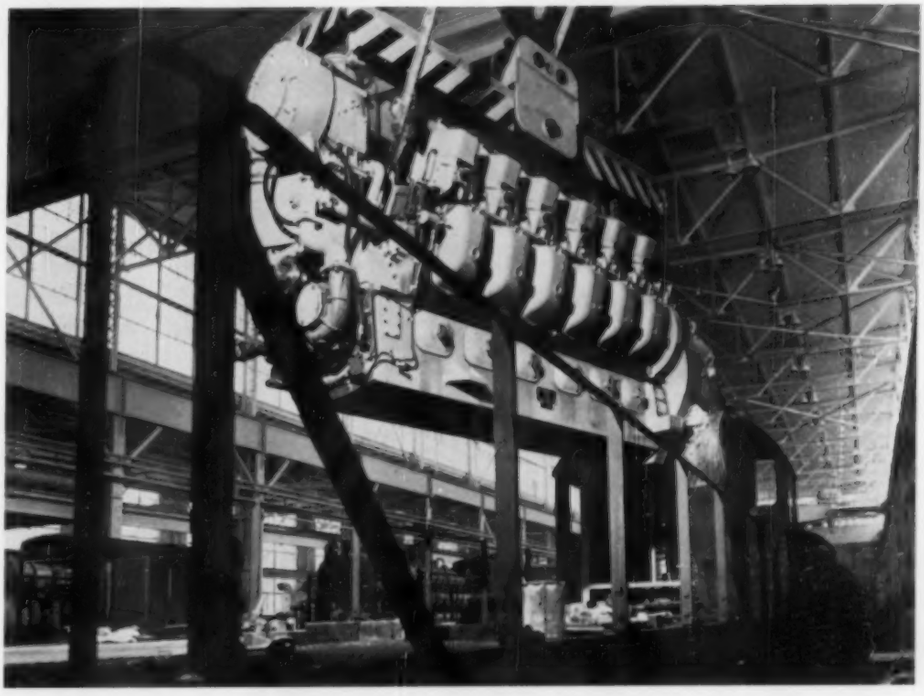
Alco Formally Opens New $4 Million Locomotive-Production, General Engineering Laboratories Facilities.

A BUSTLING new locomotive-production center and a recently integrated laboratories facility were formally opened today by Alco Products, Inc. The new locomotive plant is a straight-line production installation. In a message released to American railroads today, Perry T. Egbert, Alco board chairman, and company President W. S. Morris said the new facilities are tangible evidence of our faith in your future. The facilities will contribute to our goal of better products with more efficiency.

The combined relocation project at Schenectady, designed to consolidate production of diesel-electric locomotives and to unite under one roof seven laboratories, was completed at a combined cost of more than $4 million. The projects were begun last August under a program aimed at streamlining production and reducing over-all plant area to improve efficiencies. Futher modernization work is now in the planning stage. The heart of the new locomotive-production operation is the company's former general welding shop, an 1190-foot long building in which Alco has created a progressive-station, multi-line assembly system.

With the exception of diesel engines—which are built on separate assembly lines—together with locomotive trucks, hoods and cabs, fabrication of ready-to-operate units progresses in this building from steel-plate raw material to the completed locomotive. At the start of this year, Alco held sufficient orders to maintain full-schedule production of locomotives through January 1, 1959.

The new locomotive plant, one of the most modern and efficient in the world, is operating at full production—primarily in fabricating high-power diesel locomotives for the export market. Alco is one of the world's largest exporter of mainline diesel electrics. The production operation now centered in Building 62 obsoletes the former locomotive erection shop, which was located on the east side of the 112-acre plant and was comparatively far-removed from most back shop and preassembly operations. That building has been sold and is now being demolished. The new production setup involved the transfer of hundreds of machine tools into both Building 62 and Building 45, a former machine shop now housing the locomotive rebuild center. Building 62 is serviced by 13 cranes; five with capacities exceeding 35 tons and one crane with a rated capacity of 75 tons. United in the General Engineering Laboratories center, in what was formerly a maintenance building, are the radio-chemical laboratories for nuclear research, a thermal laboratory for study of heat-transfer characteristics, as well as instrumentation, chemical, mechanical, metallurgical, nuclear and welding laboratories. These laboratories carry on research and development projects for the company's four product divisions, as well as contract work for the Atomic Energy Commission and other companies active in the field of atomic energy.



A 12-cylinder Alco model 251 diesel engine is lowered onto the frame of a road-switcher progressing through assembly stations at Alco's new Schenectady locomotive assembly plant.

Alco Products' new progresive-station, multiline locomotive assembly plant, an 1190-foot-long building in which the company has integrated most locomotive manufacturing operations at Schenectady.

GAS TURBINE PROGRESS

A COMMENTARY BY R. TOM SAWYER

R. Tom Sawyer's well known in the gas turbine field having been the first chairman (1944) (and now treasurer) of the Gas Turbine Power Division of ASME. He spent 7 years with G.E. Transportation Dept., and 26 years with American Locomotive, now Alco Products. At present he is a Consultant, including "Consultant to the Staff" of the Experimental Towing Tank at Stevens Institute of Technology. In addition to being a Fellow Member of ASME and AIEE, he is a member of SAE, ARS, ANS, IME in London, DEUA in London. He is also a member of Franklin Institute and a Professional Engineer. Mr. Sawyer is the author of *The Modern Gas Turbine* and *Gas Turbine Construction*, and co-author of *Applied Atomic Power*.

Progress Report—Coal Burning Gas Turbine

MR. P. R. Broadley* and his assistant, Mr. W. M. Meyer, are to be congratulated in completing a successful test run of 1103 hours in 1957 with their 4000 hp coal burning gas turbine. The details of this report have recently been released and herewith are a few of the highlights of the test. Table 1 shows a comparison with tests on the same unit in 1952, 1955 and 1957. The question has been asked of me "Why has it taken six years to make three tests." The answer is a simple one. The original members of L.D.C. decided that the basic test unit be 4000 hp instead of the 1000 hp unit referred to in Progress Report No. 1 dated August 1, 1945. John Yellott, the first Director of Research for L.D.C., knew he could move at least 4 times faster in developing a smaller 1000 hp unit and at considerably reduced cost. Manufacturers in other parts of the world now making similar tests are moving rapidly; they did not repeat this mistake. Figure 1 shows the results. The turbine rotor is in far better condition than on the previous tests. Detailed inspection of this rotor shows that further testing must be done prior to placing a gas turbine unit capable of burning coal in production. The test has shown that little more can be done with this turbine. The design of a turbine specifically for burning coal is the next major step when using the L.D.C. system, as I see the results of these tests.

Figure 2 shows the complete unit. Let us follow the operation of this unit starting at the 8 ton coal tank. Approximately 50% of the coal is Sieve Size of +28 mesh, the rest is finer. Low pressure air is used to aerate the coal which flows into the lower tank. From there it flows into the coal pump which operates at a variable speed to regulate the flow of fuel in proportion to the load required. From here it goes into the Riley -LDC pulverizer operating under pressure. The coal flows from there to the combustors. As the coal leaves the pulverizer 90% of it is reduced to Sieve Size of –200 mesh. There are two combustors in parallel, one behind the other. The air that carries the coal comes from the main compressor at a pressure of about 80 psig. Between the compressor and combustor is shown a regenerator of approximately 50% effectiveness. A regenerator of higher effectiveness could have raised the thermal efficiency to at least 24% as compared to the 18% for these tests.

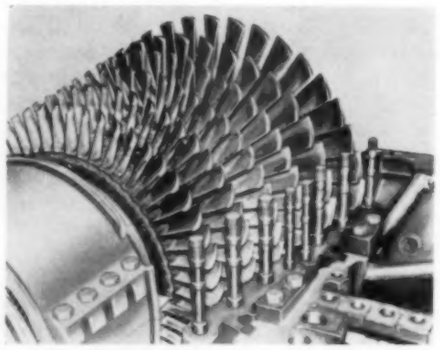


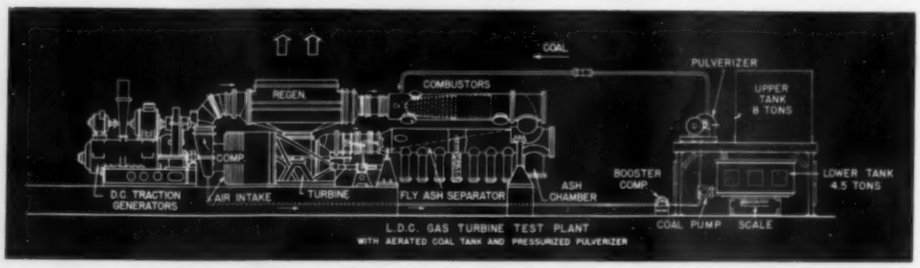
Fig. 1—Rotor of Turbine after 1957 tests.

After the coal is burned in the combustor, the fly ash in the hot gases must be removed or it will erode the turbine blades. For this reason the gases pass through a battery of separator tubes as shown. The gases then enter the turbine and skimmers and deflectors are used to collect more of the fly ash which remains in the gas stream. The turbine used allows the gases to take 6 steps to do its work as Fig. 1 shows 6 rows of blades. By taking more steps or stages in the turbine the velocity of the gas stream is moderate, therefore holding erosion to a minimum. From the turbine, the exhaust gases go through the heat exchanger to give some of the gas heat to the incoming air, making the unit more efficient. In this case the turbine shaft drives a generator through a gear reduction.

TABLE I–Summary of Operations–1952, 1955 and 1957 Tests

Item	1952	1955	1957	Total
Hours Run	757	1421:11	1102:50	3281
Tons Burned	1066	2248	1663	4977
Average Coal Rate Lbs. Per Hour	2840	3164	3002	3030
Horsepower Hours Generated	2,070,750	4,111,398	3,266,106	9,448,254
Lbs. Coal Per HP-Hr	1.03	1.09	1.02	1.05
Average Load, HP	2760	2894	2960	2880
Load Factor, Per Cent	73.8	81.70	83.66	80.70
Thermal Efficiency, % Based on Lower Heating Value	18.7	18.20	19.32	18.70

Fig. 2—Diagram of 1957 locomotive coal system & power plant.



*Director of Research, Locomotive Development Committee, Bituminous Coal Research, Inc., Dunkirk, N. Y.

CANADA'S SCIENTIFIC SHIP *M/V BAFFIN*

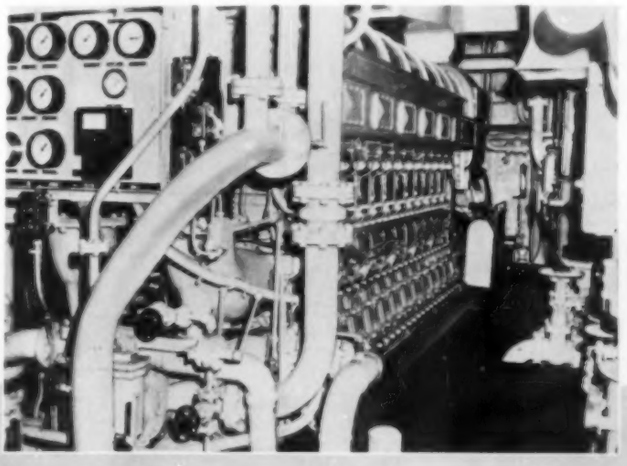
Performs Hydrographic Surveys in Arctic Ocean. Vessel Features Seven Fairbanks-Morse Opposed-Piston Diesels for Propulsion and Electrical Generating Equipment.

CARRYING highly-trained technicians and specialized equipment, the hydrographic survey vessel *M/V Baffin* plies its lonely way through the vast reaches of the Arctic Ocean. Poised near the top of the world, the only buffer between North America and Russia, this watery wasteland occupies a strategic position. The Canadian Government, realizing the importance of this area, has designated the scientific ship to chart navigable waterways and for topographical surveys of the coast and surrounding areas. Equipped with the most modern devices available to hydrographers and scientists, the *Baffin* is helping to extend the useful borders of the Arctic to alleviate future commercial or logistical problems. Seven Fairbanks-Morse diesel engines provide the essential propulsion and electrical power. The powerhouse which drives the ship through these remote waters is a battery of four Fairbanks-Morse 12-cylinder model 38D8⅛, 2 cycle opposed-piston diesels, each rated 2000 bhp at 750 rpm. These constant rotation engines are arranged in sets of two, each set driving a propeller through a reverse reduction gear box. Propeller reversal is effected by engagement or disengagement of hydraulically operated clutches in the gear box, providing for lowered maintenance since the engine itself need not be reversed. A pneumatic control system, with built-in delays and inter-locks, insures correct timing and sequence of engines and gears for any maneuver.

The propellers can be powered by either or both engines of a set depending on speed requirements. This combining of diesel plants is accomplished by driving through a two pinion gear in each gear box by means of controllable slip hydraulic couplings. Propeller speed and direction can be governed from both the engine room and wheel house by two handles, one for each propeller. These simple controls assure quick and positive response for any maneuver. Main electrical power is produced by three Fairbanks-Morse 400 kw generating sets. Each unit consists of a 4-cylinder model 38-D8⅛ opposed-piston diesel engine, connected directly to a 40 kw, 450 volt, 3 phase, 60 cycle alternator. Units are mounted on vibration-free assembly bases. Most parts of the generating engines are interchangeable with those of the main propulsion engines, a decided advantage for isolated sea operations of this type.

The equipment and accommodations aboard the *Baffin* are elaborately designed to facilitate and expedite survey work in uncharted waters. The lower deck, for example, includes a projection room, laboratory, photography and printing rooms, and a large drawing office. These facilities enable hydrographers to save valuable time by drawing their charts while on board ship. Water depths are probed with special echo sounding instruments for a plotting room located on the flying bridge. Operations can be carried out with greater ease from this vantage point than from an open deck or from the drawing rooms below. Two helicopters and six sounding launches, carried aboard ship, are at the disposal of the scientists for aerial survey, reconnaissance and photography. These auxiliary craft can also be used for ice navigation. Electronic navigation aids include two radar sets for long, intermediate and short range protection. Operators are thus enabled to use one set in charting operations while the other is used for navigation at a different range. Special electronic position fixing equipment is carried in addition to the regular Loran navigation system which maintains contact with ground stations.

View of one of four Fairbanks-Morse opposed-piston, 12 cylinder diesels which power the ship. Three more O-P's provide electric power.



Launched in Canada for survey work in Arctic waters, the *M/V Baffin* carries a highly trained staff of scientists and modern hydrographic equipment for on-the-site operations. Seven Fairbanks-Morse opposed-piston diesels provide propulsion and electric power.

WHAT'S GOING ON IN ENGLAND

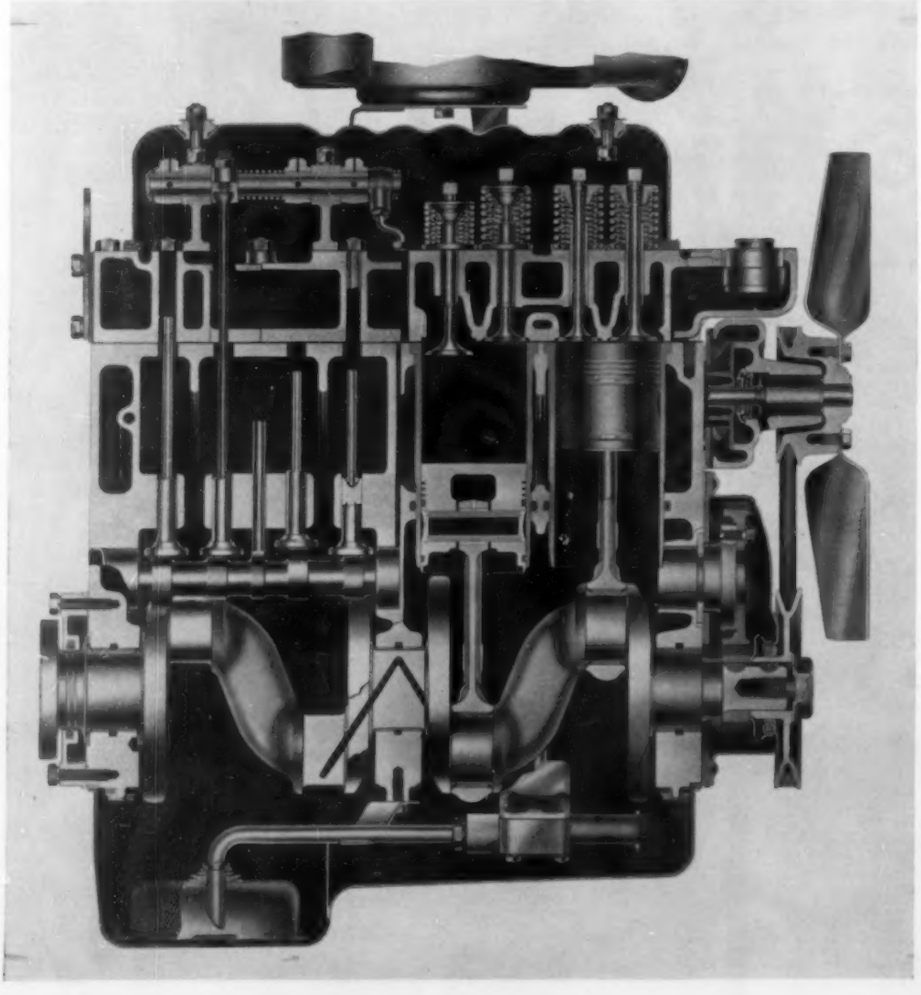
CONDUCTED BY **BERNARD W. LANSDOWNE**

Bernard W. Lansdowne is an associate member of the Institution of Mechanical Engineers and is widely known among British and European diesel manufacturers as a former editor of our English contemporary "Gas & Oil Power." His early workshop training was spread over seven years with A.E.C. Ltd., Southall, following which he served some five years with that company's sales engineering department. He is now specializing in industrial advertising with Roles & Parker, Ltd. in London.

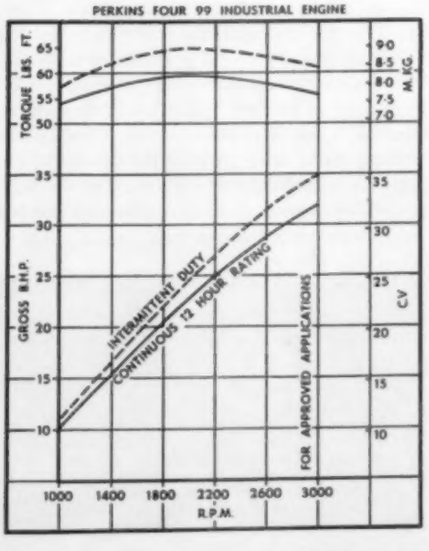
Perkins' New Four-99 Diesel

A NEW small 4-cylinder high speed diesel engine described by its designers, F. Perkins Ltd., as revolutionary, has recently been shown to the technical press and other interested parties at Peterborough in England. The new engine is available for both automotive and industrial purposes, but it is in the former role that it merits most attention. The Four-99 has four 3 in. bore by 3½ in. stroke cylinders and weighs only 320 lb. It develops 43 bhp at 4,000 rpm when used in ordinary automobiles; 42 bhp at 3,600 rpm for vans and trucks and in its industrial form it is rated at 32-35 bhp at 3,000 rpm. Independent tests carried out in England supervised by officials of the Royal Automobile Club, have shown that when fitted to a number of contemporary British cars, fuel consumption figures of over 50 miles per gallon at average speeds of 35 mph have been achieved. These figures were obtained over a test route of some 218 miles, covering both city and open country operation with maximum speeds sometimes exceeding 80 mph.

Among the design features that have made these performance figures possible are the use of a rotary type fuel pump that will give satisfactory running at over 4,000 rpm, coupled with the use of a new combustion system. This latter is covered by British Patent No. 599,755, and was specially designed for the smaller size of cylinder employed in this engine. The upper part of the combustion chamber is hemispherical in shape, and is machined into the cylinder head. The lower half of the chamber is formed by an inserted machined plug, which contains the throat or oval port connecting chamber to cylinder. Fuel is injected into the combustion chamber by means of a pintle type nozzle. During the greater part of the compression stroke, air is transferred into the chamber from the cylinder vertically upwards through the oval port, and produces swirl in the chamber, moving transversely across the nozzle. In the later stages of compression, the direction of air transfer is gradually changed



To the left, the new Perkins Four-99 diesel, which weighs only 320 lbs. Power curves for the industrial version of this engine are shown below.



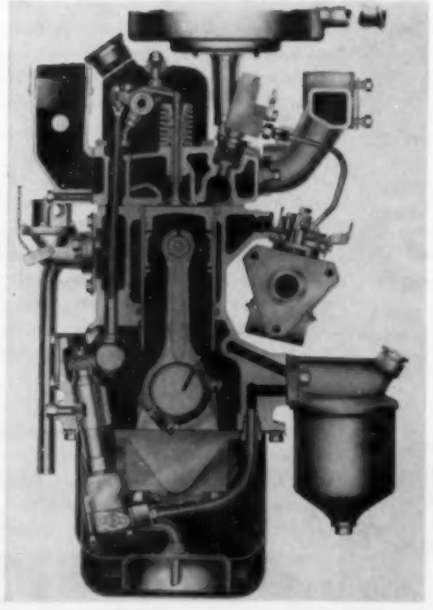
from vertical to horizontal. When combustion is about to begin, the final part of the air is transferred violently from the head, through the special shaped passages machined in the head and chamber insert, horizontally into the combustion chamber to promote considerable turbulence in the mixture of fuel and air already present. By this means, complete combustion is promoted and the maximum possible quantity of air is utilized.

The engine cylinder block and crankcase is a one piece high duty alloy iron casting which houses centrifugally cast iron wet liners. Three main bearings of the thin wall steel backed lead bronze type carry the chrome molybdenum steel crankshaft which itself is forged with integral balance weights. The H section connecting rods also have thin wall lead bronze bearings for the big ends and are joined to the pistons by fully floating gudgeon pins. The pistons are of special high silicon aluminum alloy and each is fitted with three compression and two oil control rings. The top compression ring is chromium plated. The timing mechanism incorporates camshaft and fuel injection pump gear drives and provision is made for precise adjustment of the valve and fuel pump setting. The timing gears are enclosed by a pressed steel cover secured to the back plate and bolted to the front face of the cylinder block. Cast iron is used for the camshaft which is mounted low on the air intake side of the cylinder block, supported by three bearings running directly in the cylinder block. High duty alloy iron is also used for the cast cylinder heads which are secured to the cylinder block by well placed screw studs. The overhead valves are operated by mushroom type tappets located in guides in the cylinder block, the operation being through push rods to the rocker gear.

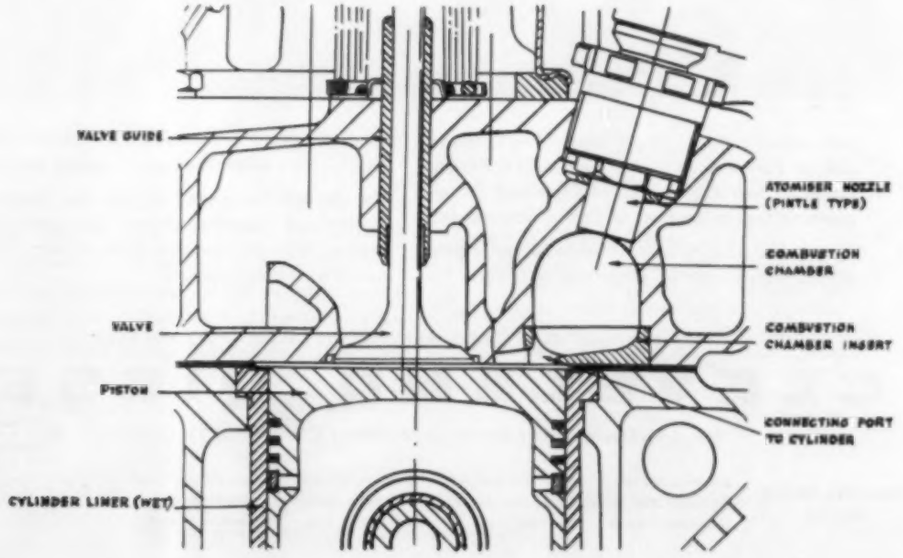
The distributor type fuel injection pump is flange mounted on the side of the cylinder block and is available with either hydraulic or mechanical governing. A diaphragm type fuel lift pump is located on the tappet cover at the air intake side of the engine and is driven from an eccentric on the camshaft, via a small push rod. Engine lubrication is provided by a lobe type pump secured to the cylinder block and driven by spiral gears from the camshaft. Oil is delivered by the pump through a full flow filter to a main gallery drilled lengthways through the crankcase, feeding all the main bearings and thence to the big ends. An oil cooler can also be provided if necessary. Among the auxiliary equipment provided is a C.A.V. Thermostart heater fitted in the induction manifold.

Longitudinal cutaway view showing details of construction of this lightweight engine clearly.

Transverse cutaway view of this 3 in. bore by 3½ in. stroke, four cycle, four cylinder diesel.



Closeup view of patented combustion system.



Michigan-Ohio News

By **Jim Brown**

CYRIL J. Burke, Inc. of Detroit reports a recent delivery of a model 125 Pettibone 1⅝ yd front end loader equipped with a GM 4-51 Detroit diesel engine to Mr. John Longo, a Detroit paving contractor.

BARTON Paving Co. of Ann Arbor, Michigan has accepted delivery on a Cummins 60 kw enclosed generator set. The generator set consists of a model NHC-4-IT Cummins diesel engine, a G. E. generator and a Lake Shore Equipment panel. The set will be used to supply power for portable batch plants.

McCOMB County, located near the city of Detroit, has accepted delivery on a Galion model 118 Motor Grader. The new grader is powered by an International Harvester diesel engine and was purchased from Wolverine Tractor and Equipment Company.

AN HD16AC Allis Chalmers crawler tractor equipped with a hydraulic model 16BD dozer blade and a model 75 rear power cable control unit has been sold to Wexford County Road Commission in Cadillac, Mich. Sale was made by Earle Equipment Company of Detroit.

CONTRACTORS Machinery Co. of Detroit has sold a Murphy model 12 diesel generator set rated at 78 kw to Winkworth Fuel & Supply Co. of Detroit, Mich. This complete unit will be used to generate electricity for a new Burmeister Portable batch plant. The generator set will be broken in at a road construction job near the junction of M-60 and M-99 near Jackson, Michigan.

THE Construction Machinery Division, Clark Equipment Co., now is offering open-face steel compactor wheels as standard attachments for the Michigan model 180 tractor dozer. The new attachments replace the rubber-tired wheels; no other modification is necessary. The tractor dozer can then be pulled off spreading or dozing operations and put to work compacting fill. With the dozer blade ahead of the compactor wheels, the Michigan can spread material as it compacts. The 60-in. dia wheels are 22 in. wide on the front axle and 26 in. wide on the rear. They develop 810 lbs of compression per inch of roll face.

BRECHEISEN Service of Petosky, Michigan, a dealer of Cummins diesel engines, recently delivered two model H-6-BI Cummins diesels to the Penn Dixie Corp. The new Cummins engines will be used to power a 45 ton G. E. locomotive.

CLEO Whiles of Detroit is breaking in a new International model TD-14 crawler equipped with a hydraulic bulldozer blade and IH diesel engine. The sale was made by Wolverine Tractor and Equipment Company of Detroit.

DORR W. Spangler, Wayne, Michigan has accepted delivery on a model HD6G Allis Chalmers crawler equipped with a Tracto-Motive front end loader. This new AC unit was sold by Earle Equipment Company of Detroit.

MACK Trucks, Inc. of Dearborn, Michigan has appointed three new distributors in the lower peninsula of Michigan. They are: Lansing Mack Sales & Svc. Inc. 301 North Larch St. Lansing, Michigan. Midway Service Garage 2344 Park Street, Muskegon, Mich. Mack Sales & Svc. of Flint, Inc. 1115 S. Dort St. Flint, Michigan.

CARL Parker of Cass City, Michigan has accepted delivery on a new model 1000 Case 'dozer equipped with a JD-382 Continental diesel engine and a hydraulic bulldozer blade. The sale was made by J. R. Panelli Equipment Company of Detroit.

R. G. MOELLER Co. of Detroit has recently delivered a Lorain model MC 254 Moto-crane equipped with a GM 3-71 Detroit diesel engine to Genesee County Road Commission.

FOUR standby generator sets using Marathon electric generators and Cummins model NHRS-6-IP diesel engines to produce 150 kw were recently delivered by Cummins Diesel Michigan, Inc. to Air Force bases in Michigan. The generator sets will be used by Kinross AF Base, Kinross, Michigan; Selfridge AF Base, Mt. Clemens, Michigan; K. I. Sawyer AF Base, Marquette County, Michigan and the Wurt Smith AF Base located at Oscoda, Michigan.

CYRIL J. Burke, Inc., of Detroit recently delivered a model 25 Northwest truck-crane to W. J. Storen Co. of Detroit. The 25-ton crane is mounted on a 6 x 6 crane carrier and is powered by a GM Detroit diesel engine.

THE City of Flint has purchased one of the new long track Allis-Chalmers crawlers. This one, a model HD6E equipped with a hydraulic bulldozer, was purchased from Earle Equipment Company of Detroit.

CONTRACTORS Machinery Co. of Detroit has sold a Murphy model 12 diesel generator set rated at 78 kw to Rogers City Cement Products Company located in Rogers City, Michigan. This complete unit will be used to generate electricity for a portable batch plant at a road construction site in Rogers City.

IT HAS been estimated that Michigan road builders will move more than 35 million cubic yards of earth during 1958 in order to meet the State Highway Department's construction needs. The 1958 excavating job will cost more than $11 million, estimated from the 1957 average of 32 cents for each yard moved. A large part of the 1958 earth moving work will be over new expressway routes, where it is estimated that more than a quarter of a million cubic yards of earth must be moved for each mile of future dual highway.

R. C. HENDRICK & Son has accepted delivery on a model 800 Case crawler equipped with hydraulic angle-dozer blade and powered by a Continental HD-277 diesel engine. The sale was made by J. R. Panelli Equipment Company of Detroit.

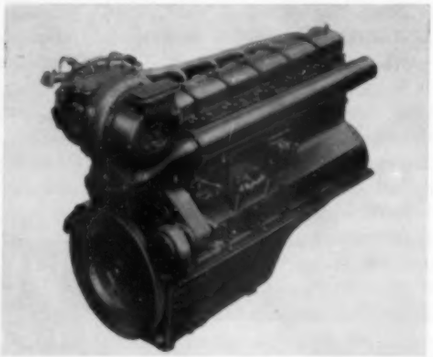
WOLVERINE Tractor and Equipment Co. of Detroit recently sold a Galion model 118 Motor Grader powered by a GM Detroit diesel engine to Oakland County, Michigan.

CHADDOCK & Creeley Co. of River Rouge, Mich. has purchased from J. R. Panelli Equipment Co. of Detroit a Worthington Blue Brute model 315 compressor, powered by a model NH-4-R Cummins diesel engine.

Sales Promotions

Promotion of Frederick W. Walker, Jr. Chicago regional manager, to the post of assistant general sales manager in charge of electric utility sales for Electro-Motive Division of General Motors has been announced by Paul R. Turner, director of sales for Electro-Motive. At the same time, Mr. Turner announced the appointment of James B. Swindell, former district sales manager in the Chicago region, as Chicago regional manager succeeding Mr. Walker. "In his new capacity, Mr. Walker will be responsible for domestic sales of Electro-Motive's line of transportable electric generating equipment designed especially for economic handling of peak loads on the nation's electric utility systems and for furnishing supplementary power for central stations in other low load factor situations," Mr. Turner said.

Mercedes-Benz Diesel Available



The Utica Division of the Curtiss-Wright Corporation announces that the MB 836Bb Mercedes-Benz diesel engine is now available in the United States. It provides turbocharged diesel power for applications in the 325-525 hp range. The MB 836Bb is a six cylinder, lightweight, vertical in line, 4-cycle liquid cooled engine with a compression ratio of 16 to 1. Combustion system is the Daimler-Benz pre-combustion chamber type, utilizing Robert Bosch injection pumps and nozzles. It weighs only 4830 lbs with over-all dimensions of 84 in. long, 41 in. wide and 64 in. high. Glow plugs are provided to give fast, dependable starting even under adverse climatic conditions. Such engineering features that are standard equipment include: aluminum alloy cylinder block, pistons and oil pan, easily adjusted valve actuating mechanism, efficient 4 valve cylinder heads, lubricating system employing separate pump for lube oil cooler and an easily maintained over-all design. The MB 836Bb is available in either heat exchanger or radiator cooled models for ships, drilling rigs, pumps, compressors, construction, mining and logging machinery, plus many other uses. For information, contact Curtiss-Wright Corporation, Utica Division, Utica, Michigan. (ITS NEW)

President of ICEI

L. F. Shoemaker

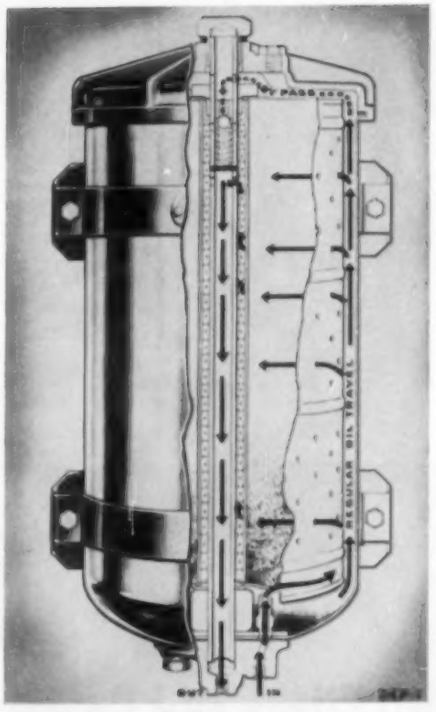
L. F. Shoemaker, Allis-Chalmers Mfg. Company, was elected president of the Internal Combustion Engine Institute at the annual meeting in March. He succeeds F. C. Langston, Jr., of the P & H Diesel Engine Division, Harnischfeger Corp., who continues as a director. Other officers of the Institute for 1958 include Commander A. D. Marks, Hercules Motors Corp., vice president; H. H. Howard, Caterpillar Tractor Co., treasurer; and James V. Doe, Willys Motors, Inc., Secretary.

New Heavy Duty Oil Filter

A new design oil filter for heavy duty diesel applications like trucking, construction equipment, etc., has been announced by DeLuxe Products Inc., Racine, Wisconsin. This new by-pass type filter is called Graduflo and is available in two models—the HS with a capacity of 2.75 gal. and size of 500 cu in. and the HL with a capacity of 3.50 gal. and size of 750 cu in. A number of features have been engineered into this new filter series. The total weight of the filter is less than conventional filters and this is accomplished through the use of lightweight aluminum cover construction, report DeLuxe engineers. This cover is ribbed for high strength and is held down by only one central bolt, making maintenance easy and quick. The lightweight characteristic is especially important in trucking applications where lightweight components are essential. Another important innovation is the inclusion of an all-weather relief valve in the filter, which lets oil warm up rapidly and insures even pressure inside the filter regardless of outside pressures developed. Cold oil cannot enter the filter cartridge but is directed back to the crankcase to warm up faster.

Thus contaminants caught in the filter cartridge cannot be squeezed back into the oil stream by high pressures often developed when cold oil is circulated through a filter. As soon as the oil reaches operating temperature, the by-pass valve closes and the filter goes to work. A specially placed removable inlet metering orifice is featured and is located so that oil entering the filter comes in well above the filter sump so as not to agitate accumulated sludge in the sump. This helps lengthen filter cartridge life. All parts of the filter are replaceable without the necessity of buying a complete new filter.

High filtration efficiency results from the staple cotton fibres in the cartridge which absorb 5.25 times their own weight in contaminants including acids, moisture, suspended particles and colloidal impurities. The fibres have a high micro-mechanical attraction, giving high absorption ability and loading capacity and insuring long and economical cartridge life. The filtering material can remove impurities without affecting oil detergents and active additives.



Several truck manufacturers are offering this filter as original equipment on diesel models. For more information write DeLuxe Products, Inc., Racine, Wis. (ITS NEW)

Sales and Service Manager

William F. Pressnell

Robert G. Jeffery, Owner & Manager of Hancock Diesel Service Company, Findlay, Ohio, reclaimer and rebuilder of diesel fuel injection equipment, announces the return of William F. Pressnell to the post of Sales & Service Manager. Mr. Pressnell will supervise the sales activities throughout all 48 States and Canada. He has had extensive experience in the field of diesel sales and promotion, his immediate previous affiliation being with the Fairbanks Morse Company. Interest in the diesel business arose for Bill while serving two and one-half years in the Submarine Service as a diesel mechanic.

Army Engineers Patrol Boat

A new steel, twin screw seagoing cruiser used by the U. S. Army Corps of Engineers on the Garrison Reservoir in North Dakota, is powered with two Hercules TCDO283M turbo-charged marine diesel engines. The patrol boat was recently delivered to the Corps by Kargard Company of Marinette, Wis., which adapted the design from its Standard Model 38 ft pleasure cruiser. It has accommodations for a crew of four. During trial runs, the boat displaced 20,000 lbs and did just slightly better than 21 statute mph with the engines turning 3,000 rpm and driving two Wirkkala 22 by 21 in. propellers through the 2.03:1 reduction gears.

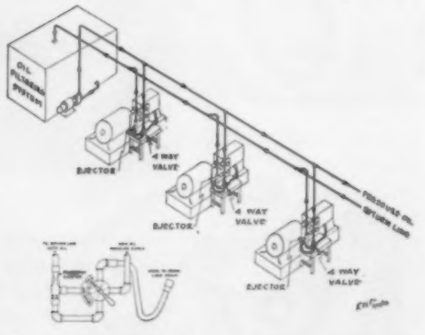
The Army boat is being used for survey, patrol and rescue work on the Garrison Reservoir. This is a 200 mile long body of water created by the government building of Garrison Dam at Riverdale, North Dakota.

Heads Industrial Division

William F. Rogge

The appointment of William F. Rogge as general manager of the Industrial Division, Aeroquip Corporation, has been announced by Peter F. Hurst, president. Mr. Rogge's duties will include responsibility for the Industrial Division's manufacturing plant in Van Wert, Ohio, and the industrial sales division, which headquarters at Aeroquip Corporation's general offices in Jackson, Michigan. Mr. Rogge joined the Aeroquip organization in 1954 as general sales manager of the Industrial Division. Mr. Rogge is a native of Cincinnati, Ohio, and a graduate of the University of Cincinnati. Before joining Aeroquip, he was general sales manager of the World Bestos Division of the Firestone Tire & Rubber Company.

Crank Case Drainage on Test Stands

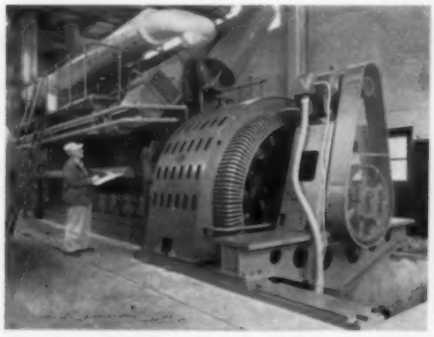


This new diesel testing installation required a system to provide each test stand with lubricating oil under pressure and also a method of rapid crank case drainage. The solution uses oil pressure available at each test stand to drive a Penberthy ejector. A 4-way valve, in the system, permits crank case to be drained or filled through the same drain connection by manipulation of a single valve. The Penberthy ejector, Series 162A, proved successful considering the high viscosity of oil on cold starts and

the high discharge head to overhead discharge line. Further information is available from Penberthy Mfg. Co., Holden Ave., Detroit, Mich. (ITS NEW)

Radio Transmitter Powered By Diesel Generator

Located in a mountain fastness, 55 miles northeast of Seattle, Washington is the Jim Creek Naval Radio Station. The station is the voice of command for all ships of the U. S. Navy. To quote Adm. Carney: "The station is able to flash commands to our submarines beneath the water, to our Arctic outposts, to our ships and aircraft on and above the seas." Electric power for the giant transmitter is furnished by a diesel driven, synchronous generator built by Electric Machinery Mfg. Company.



The generator is rated at 2500 kw, 450 rpm, 4160 volts. The Navy specifications for the generator rigidly spelled out voltage regulation (the percentage amount voltage can vary with load) to ±10%. This requirement was particularly stringent because when the station is "keyed," a load of 1700 kw is instantly placed on the generator. For the transmittal signal to be "loud and clear," the transmitting voltage must be very steady. In operation, the diesel-generator combination has consistently held voltage variations to within ±2%. The above photo illustrates the diesel engine and the generator. The installation is typical of military stations throughout the world which rely on diesels in the performance of their duties.

Gas Turbine Driven Crawler Tractor

An experimental crawler tractor powered by a high speed gas turbine is disclosed by Allis-Chalmers Mfg. Company, Milwaukee. Inside the tractor's engine compartment, a Boeing 502-10C gas turbine power unit has replaced the conventional diesel engine in this early experimental version of what may be the crawler tractor of the future. The experimental model, named the P-91, has been assembled for purposes of research, according to Allis-Chalmers. It is part of the company's continuous program of investigation into heat engines suitable for use as power sources in vehicles. The firm said that the gas turbine has "certain interesting possibilities."

The design of the gas turbine involves the equivalent of a built-in torque converter, which is standard equipment on Allis-Chalmers' model HD-21 crawler tractor. Ability of the turbine to deliver the range of speed and flexibility of power required for successful tractor operation will be thoroughly tested and evaluated as Allis-Chalmers continues this far-reaching research program. One of the early steps in this program came several years ago when a group of key technical people from Allis-Chalmers visited Boeing's industrial products division in Seattle, Wash. In the years that followed, extensive research was done by Allis-Chalmers on several turbine engines. Net horsepower developed by the turbine to drive the tractor is said to equal that of its diesel counterpart. The external appearance of the experimental P-91 differs little from today's current model of the HD-21. According to the company, exhaust gases while greater in volume have been handled in such a way as to avoid any inconvenience to the operator. Noise level of the experimental unit is reported to be equal to the diesel powered unit, although the pitch and character of the sound is entirely different.

West Coast News

By James Joseph

A MODEL 12006-A GM twin 6-71, with 2:1 reduction and a GM model 2064 20 kw auxiliary generator have been installed in Columbia River Bar Pilots Association's combination tug and charter boat.

UNDER west coast road test: the new Volvo L-375 truck tractor with Volvo D-47A, 90 hp diesel engine, distributed in western U. S. by Sherman Oaks, Calif.'s Auto Imports, Inc.

DELIVERED to National Steel and Shipbuilding Corp., San Diego, a 6 cylinder, 960 hp, model 38D8-⅛ Fairbanks-Morse marine diesel.

FARALLONE Fisheries' boat *Elsie B*, operating from Santa Barbara, Calif., has been equipped with a GM 2061A marine diesel, with 3.5:1 ratio R&R gear.

POWERING winches on Bethlehem Supply Co.'s offshore coring barge are two GM 3-71 diesels. Barge works from Los Angeles.

DE YOUNG Logging Co., Elma, Wash., has repowered an International Harvester rig with a Cummins 175 hp JT-6-B engine. Sale by Cummins Diesel Sales of Washington, Seattle.

GUNDERSON Bros. Engineering Corp., Portland, reports sale of a GM 6-71 marine unit with 3:1 Allison hydraulic reverse and reduction gear to Chelsea Knight, for his tugboat.

FOR their dry cargo barge, Columbia Snake Towing Co. has taken delivery on four GM 6-110 engines.

SEASIDE Oil Co., Santa Barbara, Calif. has repowered a Kenworth CB-825-C with a Cummins NH-220 diesel.

TRAILER-mounted 300 kw generator set, operated by Eugene Oregon's E. C. Swaggart, is powered by Allis-Chalmers 8DCS-2505 diesel. Auxiliary equipment: Schramm air compressor with cold start by diesel-fired Hotstart.

TO American Independent Oil Co., San Francisco, a Fairbanks-Morse 6-cylinder Model 49B4½, 180 hp diesel.

SEATTLE'S Pioneer Sand & Gravel Co. has repowered a Kenworth 923 RB with a Cummins NH-220 engine.

TO Pasco, Washington's Bill Warner: an 8DASMR-1125 Allis-Chalmers diesel with Capitol hydraulic marine gear to repower tug working Pasco area. Boat, 58-ft long, is one of five in fleet that is Allis-Chalmers powered.

FOR THE Anaconda Co., Butte, Montana, a Cummins 220 hp NH-6-B1 diesel, to power Euclid Dump Truck.

LYNDEN, Washington's Lynden Transfer Co., has repowered a Kenworth rig with a Cummins NH-220 diesel engine.

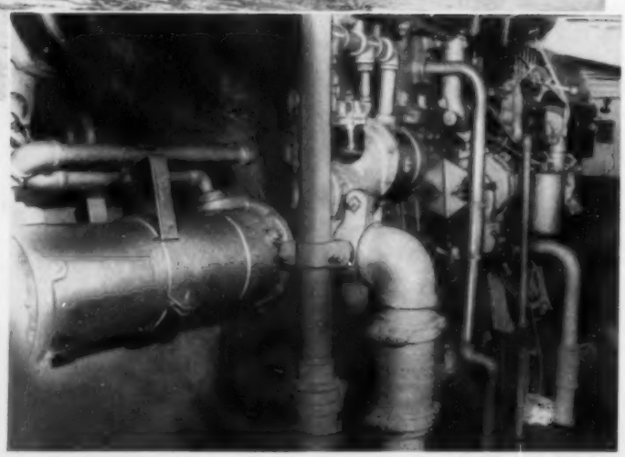
TO LONE Pine, Calif.'s Inyo Builders Inc., a 30 hp, 48B3¼, 4-cylinder Fairbanks-Morse diesel generating set.

DELIVERED: to Bonneville Power Administration to drive two 125 kw generators as auxiliary flood-gate openers, two model 6031, 6-71 Detroit diesels.

FOR crane conversion—a Detroit diesel model 3082, 3-71 diesel equipped with torque converter—to Ed Stowers Logging Co., operating Portland area.

SOLD TO Columbia River Packers Association, a 3071-C, 3-71 GM Detroit marine diesel with 1.5:1 Paragon hydraulic reverse and reduction.

TO SAN Rafael, Calif.'s Ralph E. Murphy & Sons, a 10½ hp, model 45B4-⅛ Fairbanks-Morse diesel generating set.



A typical Waukesha Defender (LRD Series) Turbocharged Marine Diesel installation

Inland River Reports

By A. D. Burroughs

THE 64.6 x 23 ft *Cheramie Botruc III*, third craft completed by Blount Marine, Warren, R. I., for Cheramie Bros. Boat Co., La., is now in service with 600 hp from two GM 6-110 diesels. Onan generators, Perry oil filters, Raytheon radar and Columbian Bronze Corp. propellers are carried.

THE Chicago christening of the beautiful 89 x 26 ft tug, *Linda Brooks*, collected a cross-section of prominent riverfolks. Built by Parker Brothers & Co., Houston, Texas for owner Brooks Liquid Transport, Inc., two 800 hp Superior Model 40-M5X-8 engines supply main propulsion power. Two International Harvester engines provide auxiliary power.

THIRTEEN tugs are on the construction schedule at Equitable Equipment Co., New Orleans, to be delivered to South America. Two tugs will measure 41 x 11 ft with 182 hp each. Six twin-screws, 52 x 16 ft will have 364 hp each, and five twin-screws, 60 x 21 ft will deliver 580 hp.

EQUITABLE'S schedule also includes a 580 hp twin-screw tug, 60 x 21 ft, for C. A. Maritima Falcon, plus six 200 hp tugs for stock. Two additional 460 hp twin-screw tugs, plus two twin-screw 600 hp tugs are on Equitable's fast-growing construction schedule, too.

THE new Morgan City, La., corporation, D.B.C. Boats, Inc., took delivery of the 80 x 20 ft crewboat, *Thos. B. Bardos*, from builders, Sewart Seacraft, Inc., La. Two model 6-110 GM engines, rated at 220 hp each, supply propulsion power.

THE active 15-year-old towboat, *Charles R. Stevenson*, was busy in the upper Ohio River coal trade, sporting a new river radar outfit. The Ohio River Company towboat, formerly called the *Sohioan*, is powered with Fairbanks-Morse engines for the 2416 hp.

TWO big beautiful sister boats met on the upper Ohio River to provide a seldom-seen sight. MVBL's *Valley Transporter* was downbound, *Valley Voyager* upbound, both powered with Nordberg Supairthermal engines, rated by many in the 6,000 hp class.

THE talented towboat, the *Toltec* was turning in a neat performance with a petroleum tow at Cairo. The 150 ft vessel had power to spare, supplied by three Enterprise engines rated at a total 3975 hp, giving profitable service for owner Indian River Lines.

THE Arkansas River will see a new traveler with the completion of the 48 x 16 ft twin-screw towboat under construction at Marine Welding & Repair Works, Inc., Greenville, Miss., for W. D. Jeffrey Construction Co., Little Rock, Ark. With exception of propeller placement, the craft will be identical to the *Commercial*. Power will come from two GM 6-71 engines for the rated 300 hp.

OHIO River Company's *Mike Creditor* again put its power to proof causing comment pushing a long, long tow of 25 empties upstream with push performance coming from Baldwin-Lima-Hamilton engines. The 2120 hp towboat was a 1954 production at St. Louis Shipbuilding & Steel Corp.

THE Shell Oil Company will reportedly lease the new Sewart Seacraft, Inc., cargo-passenger craft, the *Capt. Jake*. The all-steel 87-ft vessel is powered with two GM 6-110 engines.

CITY of Greenville, the twin-screw towboat completed by Greenville Manufacturing and Machine Works, is bringing applause in the New Orleans-Memphis route. The 3200 hp comes from two GM model 16-278A Cleveland diesels. Owner Valley Towing Co., Miss., lists Briggs clarifier oil filters, Ross oil coolers, and Gardner-Denver compressors.

TONNAGE increases came at Keokuk, heavy in oil traffic. *Lotta Bull* locked through with a molasses tow, with fine service provided by three Fairbanks-Morse engines. The 1440 hp towboat, owned by Bull Towing Co., was built by Nashville Bridge in 1956.

ANOTHER 1956 towboat, *Prairie State* was spotted with a mixed tow. Owned by Mid-West Towing Co., the 150 ft craft is powered with two Cooper-Bessemer engines for the rated 2400 hp.

IN ANSWER to inquiry, the name *John Morris* has been used for several vessels in the Patton-Tully Transportation Co., Memphis, Tenn. The current craft joined the fleet in 1957, measures 90 x 24.5 ft. and is equipped with Caterpillar engines for the rated 1,000 hp. Caterpillar also supplied generators.

THANKS to Lawrence Fox for the photo caught of the lovely twin-screw towboat, the *Aubrey Saucer* built by Saucer Marine Service for Cairo Harbor Service, Inc. The 750 hp for the 60 x 20 craft is delivered by two Cummins engines.

Management Appointments

The appointment of Harry H. Wetzel as manager of The Garrett Corporation's AiResearch Manufacturing Division, Los Angeles, has been announced by K. B. Wolfe, executive vice president. He succeeds Claude N. Monson who has been appointed vice president in charge of contract administration. Wetzel, who had previously been manager of Garrett's AiResearch Industrial Division, was succeeded in that position by Wilton E. Parker, formerly sales manager and chief engineer.

Florida Diesel News

By Ed Dennis

THE annual Port of Miami Tugboat Steeplechase was held May 22nd in observance of National Maritime Day under the joint auspices of the Port of Port Everglades and Port of Miami Propeller Clubs. The 40 ft *Adele* came in first in the free for all and under 50 ft class. Powered by a General Motors 6-71 175 hp diesel and Twin Disc 3:1 r&r gears, she maintained a speed of 14 knots over the 2 mile course. In the 50 ft and over class, the 70 ft *Atlas,* powered with a D397 turbo charged Caterpillar diesel engine and owned by the Backus Towing Co., averaged an over the course speed of 11.5 knots and took first place in that class.

LAKE Harbor Pump Station #3, of the Central & Southern Florida Flood Control Project, built into the levee around Lake Okeechobee, had two General Motors 6-2507, 6-71 series dieselized 100 kw Delco generating sets installed for the light plant and auxiliary purposes, supplied by the Florida Br. of Detroit Diesel Div. of General Motors.

AT Cape Coral, 2 Allis-Chalmers HD16 crawler tractors with 150 hp A.C. diesel engines plus one HD6 tractor with a 66 hp A.C. 4 cycle diesel, to be used in land clearing along the Caloosahatchee River, from Square Deal Machinery at Orlando, Florida.

THE *Don Emilio B* of Roatan, Honduras, a West Indies freighter operated by Hamilton Bros. of Tampa, has for main propulsion, two Cooper-Bessemer diesels. These 9x10½ 6 cyl engines are rated 315 hp each at 750 rpm. Woodward governors are used on the main engines. For auxiliary purposes two General Motors 3-71 diesel engines with 20 kw Delco generators are installed.

TWO and one half hp Petter diesel engines supply power for the Win-Power generators that were furnished by Brush-Aboe, for the newly launched 67 ft *Captain Cruiser* and *Capt. Charles.* Both were launched by Diesel Engine Sales for long range trawling and are powered with D342 Caterpillar diesel engines which work through 3:1 Snow-Nabstedt r&r gears with 34x50 four blade Federal propellers for a speed of 11 knots.

THE Pratt & Whitney plant near West Palm Beach received, for standby use, three General Motors dieselized sets. One 3150 set, a 6150 set and a 6-2508 set, all have Delco Generators and automatic starting mechanisms from the Florida Br. of Detroit Diesel Div. of GMC.

REPOWERED from gasoline, for the Win-Dixie Corp. at Tampa, an International C.O.E. hi-way tractor, to a model J-T-6-B Cummins turbodiesel. The new engine has a piston displacement of 401 cu in. and is rated 175 hp at 2500 rpm. A Fuller transmission was included and the sale was by Cummins Diesel Engines of Florida at their Tampa branch.

THE Corps of Engineers at Jacksonville received a 10 cyl 1600 hp Model 38D8⅛ Fairbanks-Morse diesel generating set.

THE Belcher Oil Co., contractors for the construction of Pump Station #7, 26 miles south of South Bay, have a 93 cont hp General Motors 4-71 diesel with a GM power take-off to run a 12 in. Fairbanks-Morse low lift turbine water pump to be used to keep foundation holes dry during their excavating and cement pouring periods.

A MERCEDES-Benz diesel model OM 636 with 2:1 Paragon r&r gears was installed in a sail boat by the Pine Island Boat Works at Pine Island. This 4 cyl 107 cu in. diesel engine is rated 36 hp

at 3000 rpm and will be used for auxiliary propulsion.

THE Intercounty Construction Company of Fort Lauderdale had their Michigan tractor shovel, model 125A, repowered with a General Motors 3057C diesel. This was the first conversion made using the Clark transmission torque converter #5293Y which meant a savings of approximately $3500. Power steering is maintained by a Hydreco hydraulic pump driven off the engine. The job was engineered and installed by the R.P.M. Diesel Engine Company of Fort Lauderdale.

A LISTER diesel engine was installed to supply power for the 4 kw 60 cycle ac Win-Power generating set on the 65 ft *Anna Jackman* built for the Presbyterian Missionary at Juneau, Alaska by J. F. Bellinger & Son of Jacksonville.

THE General Engine & Equipment Co., Tampa, supplied a General Motors 20-30C diesel for a #205 Koehring ½ yd dragline. It has a GM power take-off and is owned by Crooker Builders Supply Company of Clearwater.

THE three 53x15 ft trawlers built for shrimping out of Mexican home ports are the *Laguna I, Laguna II* and *Laguna IV*, all three are identical in construction and equipment. Powered with HRM-600 Cummins diesel engines which are rated 165 hp at 1800 rpm, they drive a 40x26 in. Wirkkala 3 blade propeller through Twin Disc 3:1 r&r gears.

THE 110 ft palatial yacht *Savitar*, at Allied Marine, has for propulsion, two D375 Caterpillar marine diesels with Snow-Nabstedt r&r gears; for auxiliary purposes two General Motors dieselized 20 kw Delco generating units. Burgess-Manning intake silencers are also in the engine room along with Ross heat exchangers.

CUMMINS diesel engines were chosen by Mr. Zincer of Clearwater for his 42 ft cabin cruiser *Cardinal*. The model NHRS6-M-600 diesels have a 743 cu in. disp and are rated 185 hp at 2100 rpm. Capitol hydraulic direct drive gears are used; installation was made by the Tampa Br. of Cummins Diesel Engines of Florida.

CAPT. D. T. Kirkconnell of the recently repowered West Indies freighter *M. V. Kirknel*, writes that after several trips, the engine room log reads a 4.5 knot increase in speed, a fuel consumption drop to 25 gal. per hr at 750 rpm and that they are thinking of repowering another vessel in the near future. An 8 cyl turbocharged model 40M5x8 Superior diesel, with direct reversing Snow-Nabstedt gears, was installed on this repowering job.

THE *Andrea C*, a cutter head type dredge, recently rebuilt and repowered by Capeletti Bros., has a General Motors 6-71 diesel to drive its 8x10 Morris centrifugal sand pump plus a 3 cyl GM 62.5 kva 150 amp diesel generating set. The mufflers are made by Donaldson. The dredge tender *Joseph D* owned by the same company has a 75 hp Hercules of the DIX series with a 1.5:1 Higgens marine transmission.

THE Tampa Bay Pilots Association at Pass-a-Grille Beach, had two 4 cyl model x Ford marine diesel engines with 2:1 Capitol r&r gears installed. These 220 cu in. disp diesels develop 68 hp at 2400 rpm, and were engineered and installed by Modern Diesel Power Co. of Tampa.

TWO DW21 Caterpillar 2 wheel tractors, powered by 6 cyl turbocharged 300 hp Caterpillar diesels, pull #470 scrapers with a 25 cu yd heaped capacity. They were delivered to the D. M. W. Contracting Co. by Shelley Tractor & Equipment Co. while the Ronlee Corp. took delivery of a similar rig; both will be used on road construction work.

Diesels All Around The World

By F. Hal Higgins

FOREST trees were planted last year for an all-time high in U.S. forestry rebuilding, according to Forest Service figures. This was 200,000,000 more trees than in the previous high year. Nurseries, state forestries and federal agencies, with private, land owners, industries and public agencies all contributing to the huge total. Perpetual logging as developed by the big lumber companies is assured with the modern diesel tractors, trucks, loaders, marine and rail equipment a big factor in the modern efficiency.

DRAYTON Diesels, Ltd., Middlesex, England, inform me it is putting its single cylinder air-cooled two-cycle diesels in the Dale electric portable generator and the Ransome MG 6 tractor. Brake hp is rated 8 and 9 for the two different models.

CANADA was a very good customer of U.S. diesel engines and diesel-powered heavy equipment for road and dam building, pipe line construction and mining last year, says *Canadian Farm Implements*. A total of $364,829,731 was the figure for 1956 for parts, and machines and equipment for construction. Tractors, engines, power shovels, and road graders were big items. And when 1957 figures are in they will be higher.

DEERE, International Harvester and Allis-Chalmers are all offering 6-row and even 8-row planters and cultivators this year to meet the demands for one skilled operator on a bigger diesel tractor to produce more per man hour of labor in step with the bigger farms and higher priced labor.

THE NEW Murphy Model MV-7199 safety fuel shut-off valve for diesel engines is announced in the Canadian dominion recently. Built by Frank W. Murphy Mfr., Inc., at Tulsa, Okla., it has proved its value on diesel-powered loaders and generators of several makes in oil fields, heavy construction and pipe line work.

LETOURNEAU-Westinghouse has recently placed in service the LW-75 bottom dump coal hauler near Farmington, Ill. It can carry about 100 cu yds of coal, or 75 tons at a load. Several radical designs feature are incorporated in the big hauler including this company's Hydrair, an air hydraulic system on both tractor and trailer units. A Hydrair piston is mounted in the king-pin connection between tractor and trailer to cushion shocks. As Let-W usually gives buyers choice of Cummins or GM engines in its standard products, the company did not announce which was chosen by the Midland Electric Coal Co. for this special job.

LARGER and lower scrapers for moving dirt in road building, strip mining and dam construction are being announced by most of the big manufacturers battling for this all important field. LeTourneau-Westinghouse, Caterpillar, Athey, Allis-Chalmers, International, Euclid, Clark's Michigan, are all out with new and improved models for picking up, moving and spreading the material encountered. GM, Cummins, Allis-Chalmers, Cat, Waukesha, Hercules engines are in these units that are 100% diesel in the big units and in Euclid, Cat and Allis-Chalmers scrapers.

ALASKA has become a hot spot in oil exploration, according to Shell Oil Co. That area may well supply much of the West Coast oil field products for its internal combustion engines in the near future as California becomes an importer of oil and Oregon and Washington demand more and more with growing populations. Shell's new Houston Research Laboratory is coming up with several new and improved refining processes and research techniques that are benefiting all Shell refineries. A research staff of 220 chemists, engineers, mathematicians and physicists, are mobilized there to get the answers.

THE Perkins diesel engine powers both the Allis-Chalmers D272 and the Massey-Harris-Ferguson 65 tractors as built in England and offered the Italian trade. The two British Ford tractors and the David Brown make five British-built diesel tractors offered in new models to the European farm market this year.

THE Leyland diesel engine is getting a big play in Australia for powering irrigation bores which means drilled wells in U.S. talk. The bored well for irrigation is a new trend in Australia. A 44 hp diesel engine on a 205 ft bore is about right, the Australians are finding.

AUSTRALIA'S biggest spray, or sprinkler, irrigation plant has just been installed by Fairymead Sugar Co. with 10 Perkins L4 diesels powering the 4 x 4 irrigation pumps to irrigate 3,200 acres of sugar cane.

TRACTOMOTIVE Corporation, which works closely with Allis-Chalmers in manufacturing the loaders for its big diesel tractors has developed a long boom to give a dumping clearance of 13 ft 10 in. under the hinge pin for loading railroad cars and such high carriers.

THE Oliver OC6 is being fitted up for the Norwegian Polar expedition in the Antarctic. Chevron starting equipment is on all three Olivers, two of the OC-6 and one of the little OC-3. Oliver got the call on competitive tests above the Arctic circle. A special track system of the bogey wheel type was developed for these tractors.

THE Volvo diesel truck engines from Sweden are in California in three models—L 375, L 385 and L 485. Auto Imports at Sherman Oaks, Calif., as exclusive importers and distributors is also handling the Volvo T55 diesel tractor. One of these appeared in the International Plowing Match at Peebles, Ohio, last fall and got a lot of attention from the 100,000 visiting farmers who saw it compete as one of the Swedish champs.

RUSTON & Hornsby, Ltd., recently added an air-cooled to their range of one- and two-cylinder engines in the power range of 4 to 12.5 hp. They are adaptable to a wide variety of drives. This old Britisher recently celebrated its centennial. Manager Roberts' crawler patents were sold to Holt before World War I to help develop the modern Caterpillar. The Akroyd-Hornsby oil engine was on the market before Dr. Diesel got his patent.

THE British Railways modernization plan calls for 2500 main-line diesel-electric locomotives in the next 15 years. In June, 1957, the first one of these diesels was delivered. It was an English Electric 8 SVT Mark II engine, rated 1,000 hp at 850 rpm.

THE Fendt diesel tractor in five models built in Germany has recently appeared on Italian markets. Like many of the new models from European factories, the 1958 Fendt tractors are adjustable for handling many farm jobs by lengthening wheel base for carrying seeder box between front and rear wheels, etc. The Fendt line came out of the rebuilt Germany as early as 1951.

J. I. CASE Co. has recently announced a series of new agricultural crawler tractors—the 310, 610, 810 and 1010. The 610 and 810 are in both gas and diesel, with the 1010 diesel only. Official test figures are not available yet, but are aimed at 3-, 4-, 5- and 6- plow farming. Case covers 124 different models in tractors this year.

AVELING-Barford is now building diesel rollers for over 100 different countries. One root of this century old company, Thomas Aveling, built the first steam roller in 1867. Barford, the other root, built the first motor roller in 1904, and the first 3-axle tandem roller in 1913. By 1927, the firm had built the first high speed diesel roller. Ford, Perkins and Ruston & Hornsby engines power different models in the Aveling-Barford line for 1958. Dorman and Leyland diesels power the Aveling-Austin and Aveling-Barford motor graders. Their dumpers are equipped with same diesels. A Fordson Major diesel is set into the firm's front end loader.

SAN Joaquin Forest and Range Experimental Station at the end of six years brush control finds an investment in brush control for cattle range pays 14%. A big crawler diesel with bulldozer was given the first job, followed by burning crushed brush and trees pushed over and piled by the tractor. Broadcast spraying from another special diesel crawler rig hit the young sprouts that came up after the burn. Rising population is forcing farming up the hills for lands to replace that taken by homes, industries and highways. That calls for more and bigger diesels from now on.

Elects New Officers

Ralph L. Leadbetter, President of Burgess-Manning Company since early 1954, surprised shareholders at their annual meeting held recently in the company's Libertyville offices, in announcing his wish to retire from the office of President. Mr. Leadbetter attributed his decision to a recent period of poor health. It necessitates his being relieved of the responsibilities which have greatly increased through his four years in office. He will continue to be associated with Burgess-Manning Company in a consulting capacity and will continue on as a Director. He is expected to reside in Philadelphia in the near future. S. G. Paddock, elected to the office of Executive Vice President one year ago, was elevated to the Presidency to replace Mr. Leadbetter. Mr. Paddock joined the company in October, 1936, in a sales capacity. He later played an important role in establishing the company's Pulsation Snubber operation with offices in Dallas, Texas. The office, established in 1951, engineers and builds pulsation snubbers for the petroleum and petrochemical market, both domestic and foreign. Mr. Paddock is expected to leave shortly for Europe to review the company's British interests, going on to several other countries on the Continent. H. A. Dietrich was promoted to Vice President, in charge of the Industrial Silencer Division, with offices in Libertyville, Illinois, and Dallas, Texas. He will continue to headquarter at the Libertyville plant, where he has served as General Manager for the past three years. Mr. Dietrich joined the Thordarson Electric Company in July, 1935, which firm became part of the Burgess-Manning organization in 1937. He has served in engineering, field service engineering and sales.

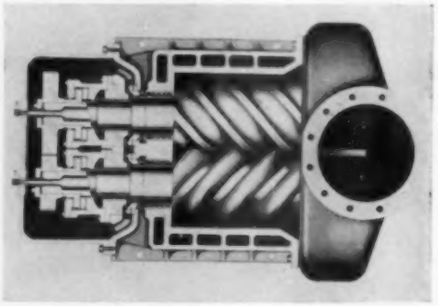
Valve Division Sales Manager

Donald D. Roberts

Donald D. Roberts, formerly a sales engineer for Eaton Mfg. Company's Valve Division, Battle Creek, has been promoted to sales manager of the Division, H. I. Dyer, general manager, announced recently. He succeeds J. R. Stearns who died recently. A native of Detroit, Mr. Roberts joined Eaton as an engineering trainee following his graduation from the University of Detroit in 1951 with a Degree in Mechanical Engineering. A year later, he was assigned to the Valve Division's sales headquarters as a sales engineer. "Mr. Roberts is particularly qualified for his new assignment as sales manager because of his intimate knowledge of the automotive valve business from the standpoint of engineering, manufacturing and customer relations," Mr. Dyer said.

New Rotary Compressor Line

A new line of positive-displacement rotary compressors that rival the efficiency and stability of reciprocating machines while matching the compactness and low maintenance of centrifugals has been announced by Fairbanks, Morse & Co. This is the first compressor of its kind to be produced in the United States for general purpose applications. The new compressor is designed for continuous heavy-duty industrial service handling air, gas or vapor. With a standard capacity range of 800 to 13,000 cfm, it is expected to have application in the process industries for both pressure and vacuum systems including industrial and instrument air, refrigeration, gas and vapor recycling, production of acids, ammonia, yeast and tonnage oxygen, catalytic cracking operations, aeration and agitation, vapor recovery and other products and processes. Heavy industry, including mining, steel mills, automotive and aircraft manufacturing, can use the new compressor for industrial and instrument air, by-product gas boosters and exhausters, combustion air and oxygen production. It will be applicable for gas distribution and storage by utilities and for gathering and transmission by the natural gas industry. Municipalities will also find the unit suitable as a sewage aeration blower.



This compressor achieves high overall adiabatic efficiencies, and compactness of the new design permits savings in weight and floor space and reduces foundation and installation costs. The F-M compressor is a two-impeller, helical-lobe type, axial-flow, rotary machine with four-lobe power impeller and a secondary impeller with six matching gaps synchronized by timing gears. The impellers rotate with a pure rolling motion and power is transmitted to the secondary impeller through the cushion of compressed gas. There is never any metal-to-metal contact between impellers or with the surrounding casing, making it unnecessary to lubricate the impellers. There can be, therefore, no lubricant contamination of the product and oil-free air, gas or vapor is assured. Maintenance is low since there are no valves or pistons to wear. As the impellers rotate, the lobes and matching gaps part on the intake end creating an intake suction comparable to the suction stroke of a reciprocating piston. Further rotation isolates the interlobal space from the intake and the intermeshing lobes reduce the volume and compress the gas. As the leading edges of the lobes pass the stationary edges of the discharge opening, compressed gas is forced into the discharge line. The interlobal space is reduced to zero before passing the discharge opening, eliminating pockets and gas carry-over. The flow of compressed gas is virtually continuous and pulsation and vibration are kept to a minimum. The standard compressor casing is a casting cored with water passages for jacket cooling. The smaller-diameter impellers are of forged steel, the larger impellers are castings. Compressor materials can be varied to meet the requirements of many corrosive and toxic gases and vapors.

Fairbanks-Morse has designed a broad line of compressors to permit high efficiency for a wide variety

of applications. There are five standard cases and impeller sizes, in single-stage and multi-stage units, for pressure, vacuum or booster service. The single-stage compressors include a range of compression ratios up to 5 to 1 which would permit intake at atmospheric pressure and discharge of 60 psig. Single-stage capacity runs from a minimum of 800 cfm to a maximum of 13,000 cfm. The two-stage compressors, with external intercoolers, offer compression ratios up to 11 to 1 and can raise a product from atmospheric intake to a maximum discharge pressure of 150 psig. Capacities for the two-stage units range from 2,000 to 13,000 cfm. The booster compressors, in casings rated for working pressures up to 250 psig, provide compression ratios up to 5 to 1. Pressure differentials are limited to a maximum of 150 psi in the 800 to 2,200 cfm range; 175 psi in the 2,200 to 5,500 cfm volume; and 100 psi between 5,500 and 13,000 cfm. In addition to the many standard units, compressors with capacities lower than 800 cfm or between 13,000 and 20,000 cfm can be custom-designed. On all constant-speed units, manual or automatic control of capacity can be built in. Because of its high operating speed, the rotary compressor can be driven efficiently by an induction or synchronous motor, diesel or natural gas engine, or steam or gas turbine. Fairbanks-Morse offers complete engineered compressor installations and this major machinery company is in a position to provide electric motors and diesel and gas engines of its own manufacture to power them. Though it is new in the United States, the F-M compressor is based on a Swedish design that has proven its advantages in European service. First important application of the Fairbanks-Morse-built rotary compressors in this country was in a fleet of mobile, high-volume liquid oxygen plants for fueling America's missiles. (ITS NEW)

Deep Well Rig

Helmerich & Payne, Inc.'s specially designed Rig No. 47 has passed the 18,629 ft mark in drilling Shell Oil Company's No. 5 Rumberger, a wildcat test of the formations lying beneath the rich Elk City Pool in Beckham County, Oklahoma. Original contract depth for the well was 17,500 ft but progress is still being made at 75 ft per day. Shell set an intermediate string of 9⅝ in. casing at 11,515 ft, and an 8¾ in. hole is now being drilled by the Helmerich & Payne rig on its first location. Designed particularly for deep drilling in the Anadarko Basin, Helmerich & Payne's Rig 47 can put 2100 actual horsepower into drawworks and main mud pumps with its three White-Superior 8G-825 gas engines. With a 250 hp independent rotary drive, and independent mud mixing pump as well, the rig is in the 20,000 ft class. Behind the Oil-Well 96-16 drawworks the rig is stepped down, with its Oilwell 1600 compound taking power from the three engine drive level. With this split section compound, the Superior power units and drive equipment are easily portable. Intermediate and rear sections carry pump drive sheaves for the pair of Oilwell 816-P 700 HP pumps, and the front section the power input sprocket and dual air flex master clutch for power to the drawworks. The main pumps and the mixing pump were used in series when Dresser's mud powered turbo-drill was tested on the hole in September of last year. With the high torque Superior engines 876 gallons of mud were put down the hole each minute as compared to the usual 550 gpm required when using conventional bits. 1800 hp is available continuously for the main mud pumps. Though air intake temperature may rise to 90° or the rig be working at an altitude of 1500 feet, this main rig power group delivers the same full output, with intermittent power to 2100 bhp. Balanced to the size of the drawworks and engines, the rig includes a derrick rated for 1,000,000 lbs and substructure at 1,400,000 lbs. The overhead string is equally heavy with a 1⅜ in. 7 sheave 580 ton crown block, 1⅜ in. 6 sheave 480 ton traveling block, and 450 ton hydraulic cushion hook. This modern rig's deep drilling accessories, a Dynamatic Brake, Brantley Drilling Feed Control, Kelco Air Slips, and the Hydril pulsation dampeners on the pumps contribute to smooth diggin,' according to Tool Pusher, Lacy Wall.

Gulf Coast Diesel Notes

By Michael T. Pate

MALLARD Well Service, New Iberia, Louisiana, has purchased from Waukesha Sales & Service, Inc., Houston, Texas, three Waukesha diesels for equipping a well-servicing rig. The diesels bought are a model 195DLCU, rated 46 hp at 1200 rpm; a model 148DKBU rated 141 hp at 1400 rpm; and a model 6WAKDBU, rated 199 hp at 1400 rpm.

REFINERIA Cabaiguan, Cabaiguan, Cuba, has bought from Stewart & Stevenson Services, Inc., Houston, Texas, a series 71, model 2030-C General Motors diesel, which will be used for repowering service at the refinery.

BUZZINI Drilling Company, San Antonio, Texas, has obtained from Waukesha Sales & Service, Inc., Houston, Texas, a model 135DKU Waukesha diesel, rated 94 hp at 1600 rpm. The diesel will furnish auxiliary power on a drilling unit.

THE U. S. Army Corps of Engineers, New Orleans, Louisiana, has secured from Applied Power Equipment & Manufacturing Company, Houston, Texas, a model DAMR779 Allis-Chalmers diesel, rated 106 hp at 1200 rpm. The diesel will be used in the Engineers' barge service.

CORPORACIONE de Fomento de la Produccion, New York City, has bought from Stewart & Stevenson Services, Inc., Houston, a Stewart & Stevenson 30 kw ac generating set powered by a General Motors diesel, series 71, model 3030-C.

THE Chicago Procurement Division, U. S. Army, Chicago, Illinois, has taken delivery on 52 additional Stewart & Stevenson special 45 kw ac 400 cycle generators, each driven by a series 71, model 3030-C General Motors diesel. The units were fabricated and delivered by Stewart & Stevenson Services, Inc., Houston, Texas.

ASIATIC Petroleum Corporation, New York City, has taken delivery of a 6-cylinder, series 110, model 62306 General Motors diesel, rated 250 hp at 1800 rpm. The diesel is to be routed for overseas service.

HAYS Aircraft Corporation, Birmingham, Alabama, has taken delivery from Stewart & Stevenson Services, Inc., Houston, of a Stewart & Stevenson special 30 kw generator, powered by a General Motors series 71, model 3030-C diesel.

JACKSON Channel & Dock Company, Rockport, Texas, has bought two series 71, model 6061-A General Motors diesels from Stewart & Stevenson Services, Inc., Houston. The engines are rated 180 hp at 1800 rpm.

FRANK Narro Export Company, McAllen, Texas, has purchased an 8-cylinder model DCS2505 Allis-Chalmers diesel, rated 508 maximum hp at 1200 rpm. The sale was made by the service facility of Applied Power & Equipment Manufacturing Company at McAllen, with the co-operation of the company's Alice, Texas, store.

DAVIS Shipbuilding Company, Freeport, Texas, has bought through Stewart & Stevenson Services, Inc., of Houston, a series 110, model 62306 General Motors diesel, equipped with a 4.5:1 hydraulic reduction and reversing gear.

SCHLUMBERGER Well Surveying Corporation, Houston, Texas, has obtained from Applied Power Equipment & Manufacturing Company, Houston, an Allis-Chalmers diesel, model DA153, rated 25½ hp continuous output. The diesel will be shipped to the company's overseas' operations.

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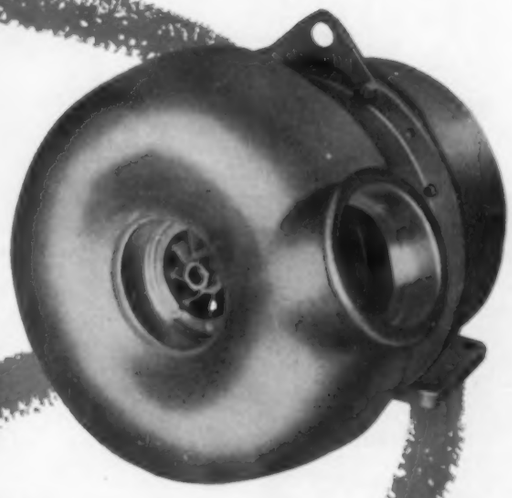
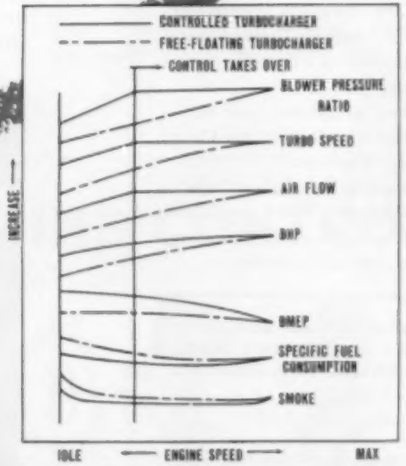


AiResearch control system keeps turbocharger output at ideal level



Improved performance characteristics of a typical turbocharged diesel engine equipped with the new AiResearch Turbocharger Control System.

Accurate control of turbocharger speed over its complete range regardless of changing load characteristics has been achieved with the new AiResearch Turbocharger Control System. This automatic control system delivers more air to the engine when needed and greatly increases torque rise, giving turbocharged diesel engines greater lugging ability when operating under heavy loads. By contrast, free-floating turbochargers operate at reduced RPM when the engine is working at below-maximum engine speed.

This improved air delivery system greatly increases the acceleration, for example, of turbocharged diesel trucks up steep grades. In a typical case, the round-trip time of a trucking company operating between Phoenix and Denver was cut from 48 hours to 42 hours. Over short hauls an off-the-road truck cut its 27-minute round-trip time to 18 minutes. Comparable gains are made for all types of turbocharged diesel equipment, stationary or mobile.

The two components of the new control system are a pressure ratio sensor and an exhaust by-pass valve. They control the speed of exhaust-driven turbochargers by modulating the amount of engine exhaust used. This eliminates overspeeding of the turboblower, and at the same time provides higher turboblower speed while lugging. Smoking is virtually eliminated under all conditions.

Your inquiries are invited.

THE GARRETT CORPORATION

AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS

Chief Engineer Appointed

Alexander Dreisin

Appointment of Alexander Dreisin as chief engineer, Fuel Injection Department, at its Harvey, Ill., Works, is announced by Allis-Chalmers Mfg. Company. He has been with the Micromatic Hone Corporation, Detroit, as chief engineer of its Micro-Precision Division at Evanston. Allis-Chalmers recently acquired certain assets of this particular Division. He formerly had been assistant chief engineer of the Diesel Engineering & Manufacturing Company, manufacturers of fuel injection pumps and nozzles. Dreisin received his Ph.D. in mechanical engineering from the Royal Institute of Engineering, Rome, Italy, in 1936. Since then he has been active in the design and development of hydraulic and fuel injection systems.

Folder Of Brochures Available

An attractive file folder of two-color brochures covering its line of clamps, couplings, and joints for industrial uses has been released by Marman Division, Aeroquip Corporation. The brochures provide detailed information on applications, sizes, and dimensions of products, and are illustrated

with photographs and dimensional diagrams. Installation instructions are also included. The new file folder may be obtained from the Advertising Department, Marman Division, Aeroquip Corporation, 11214 Exposition Blvd., Los Angeles 64, California. Marman Division is a producer of clamps, straps, V-Band and channel band couplings, Live and Conoseal joints, for aircraft, industrial, marine, farm, and railroad uses.

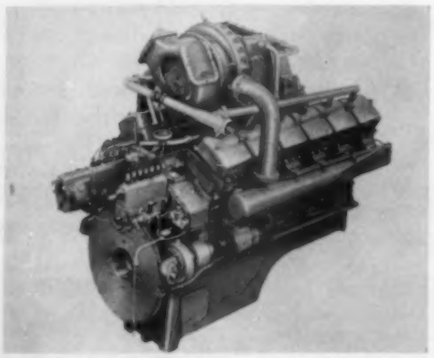
Visits Large Diesel Distributor

J. Irwin Miller, Board Chairman of Cummins Engine Company, Columbus, Indiana, visited Fort Worth recently and discussed sales plans with Ken W. Davis, President of Cummins Sales & Service, Inc., one of the largest and oldest Cummins distributors. Mr. Miller emphasized that the new 672 cu in. NH-180 diesel was designed particularly to meet trucking requirements in the Mid-Continent area, as well as the East and South. The 180 hp engine was developed from the basic components of the larger 220 hp Cummins NH-220 diesel. Mr. Davis and J. T. Calnon, Vice President—Sales, after discussions with Mr. Miller, projected 1958 sales of Cummins Sales & Service, Inc., above 1957's good sales record in the trucking field. Mr. Davis as a Cummins distributor sold his first Cummins engine in 1933 for 1934 delivery. It now has 18 shops and sales points in Texas, Oklahoma, Louisiana, Kansas, Mississsippi and New Mexico. Davis recently added three shops in Venezuela, operating as Cummins Sales & Service de Venezuela, C. A., under the supervision of Vice President L. J. Troutz. Mr. Davis and Mr. Miller have worked closely together since the time Mr. Miller took over guidance of Cummins Engine Company, pioneer high speed diesel engine manufacturer.

Left to right are L. J. Troutz, Vice President, Cummins Sales & Service de Venezuela, C.A.; Ken W. Davis, President of Cummins Sales & Service, Inc., Fort Worth; J. Irwin Miller, Board Chairman, Cummins Engine Company, Columbus, Indiana; and J. T. Calnon, Vice President-Sales, Cummins Sales & Service, Inc., Forth Worth.

Mr. Miller, who contributed sales, production and financial direction to the engineering genius of Clessie Cummins, builder of the first high-speed diesel in America, is prominent in national religious circles. While in Fort Worth, he presented a theological lecture at Texas Christian University in connection with the school's annual Ministers Week. Three endowed lectures are given each year, and Mr. Miller is the first layman so honored since the event was conceived in 1941. He was awarded an honorary LL.D. degree by T.C.U.

Engine Now Available In U.S.A.



The Utica Division of the Curtiss-Wright Corporation announces that the MB 820Bb Mercedes-Benz diesel engine is now available in the United States. This engine is manufactured in the 625 to

1025 hp range from 1000 to 1500 rpm. It is a 12 cylinder, V-type, vertical, four cycle, liquid cooled turbocharged engine with a compression ratio of 16 to 1. The MB 820 Bb weighs 6116 lbs with overall dimensions of 94½ in. long, 53 in. wide and 77 in. high. Combustion system is the Daimler-Benz pre-combustion chamber type and utilizes Robert Bosch injection pumps and nozzles. Glow plugs are provided to give fast, dependable starting even under adverse climatic conditions. The MB 820Bb combines many advanced engineering features in a heavy-duty, high horsepower range engine. Included are an efficient turbocharging system, the use of aluminum alloy for cylinder block, pistons and oil pan. The MB 820Bb is suitable for drilling rigs, generator sets, ships, large pumps, heavy construction machinery, plus many other applications where sure, dependable power is required. For information, contact Curtiss-Wright Corporation, Utica Division, Utica, Michigan. (ITS NEW)

High Capacity Filter

A new high capacity steel Fulflo filter is available in a full range of sizes, with from 24 to 270 10 in. honeycomb filter tubes. It provides continuous micro-clarity for all industrial fluids at flow rates as high as 1350 gpm, with low pressure drop. A new swing-bolt cover permits easy access to filter tubes. Optional cover-lifting davit further simplifies servicing. Standard models are for operating pressures up to 150 psi instead of the normal 100 psi. Higher pressure models are available to order. Straight line pipe connections are for 2, 3, 4 or 6 in. pipe sizes, according to capacity. Inlet and outlet pressure gauges are available to record pressure drop and indicate when filter elements should be changed. Honeycomb filter tubes are manufactured in a wide range of precision controlled densities to provide the exact degree of micro-clarity needed for each operation. Tubes are available in cotton, nylon, orlon, dacron, dynal, acetate or glass fibres. A folder containing complete technical data is available on request to Commercial Filters Corporation, 2 Main Street, Melrose, Massachusetts. Ask for Bulletin 505 A. (ITS NEW)

Midwest Diesel News

By **L. H. Houck**

CHILES Tractor & Machinery Co., Springfield, Mo., delivered an Allis-Chalmers HD-6-B to Curtis Lemmons, Salem, Mo., for use in farm contracting.

EARL Thomas, owner of the T. & O. Lime & Rock Co., Sedalia, Mo., has a new 35-M Marion with hoe hookup and GM diesel working on his 28,000 ft storm sewer job. Rig came from Ryan, St. Louis.

SIOUX City Truck Sales, Inc., owned by Jerry Wilson, Sioux City, Iowa, delivered three B-61 Mack diesels to Henry Mienders, Sioux City, to be used in hauling meat to New York.

HIRSCHBACH Fruit & Vegetable Co., Sioux City, Iowa, has purchased two Diamond T 923's with Cummins 180 hp diesels for hauling fruit and vegetables from Iowa to Louisiana.

BESSEMER Limestone & Cement Co., Bessemer, Pa., has repowered a Euclid 36FD dump truck with a HBI 6 Cummins diesel, from Cummins Diesel Engines, Inc., Monroville, Pa.

WESTERN Contracting Co., Sioux City, Iowa, prime contractor on the $320 million Oahe Dam at Pierre, S. Dak., has placed a 600 hp Michigan rubber-tired dozer on the big job. This is the first rubber tired dozer used here. It has Cummins diesels with Clark torque converter.

ROSS Williams, Ozark, Mo., has taken delivery on an Allis-Chalmers HD-11-B with dozer from Chiles at Springfield, Mo.

WESLEY D. Young, Orange City, Ia., has purchased two B-61 Mack diesels from Sioux City Truck Sales, Inc., for hauling grain to Tucson, Arizona.

MID-Western Constructors, Inc., contractors on the Texas-Illinois Natural Pipeline Co., is using three International TD-24 tractors with Superior sidebooms and International diesels on the Chicago-Marris 34-in. section.

NEW Murphy diesel dealer in Shreveport, La., is Construction Machinery Corp., 1830 Claiborne St., and it will handle sales of this diesel in northern Louisiana.

CLARENCE Luders, Sioux Falls, So. Dak., has bought two Model 733T Macks with 210 hp Cummins diesels from Sioux City Truck Sales, Inc., Sioux City, Ia., for meat hauling to the West Coast.

MERTENS Transportation, McFarland, Wis., has repowered one of its fleet of diesel trucks with a Cummins 175 hp JT-6-B from Cummins Diesel of Wisconsin, Inc., Milwaukee.

TWO Case Terra-Trac diesel tractors to Roy Chaney and Ismael Everidge, Neon, Ky. One is a 100 hp Model 1000 and the other a 1½ cu yd Terra-Trac 800 tractor shovel.

AN HD-11-B Allis-Chalmers dozer to Doane Ranch, Mountain View, Mo., for use in clearing a large acreage of timber land. Sale by Chiles, Springfield.

A 175 hp JT-6-B Cummins diesel to North Dakota Farmers Union, Jamestown, N. D., for repowering a Flexible bus from Cummins Diesel Sales, Inc., St. Paul, Minot, N. D. branch.

THREE B-61 Macks with Mack diesels and two Diamond T's with Cummins diesels to Earl Holbrook, Yankton, S. D., from Sioux City Truck Sales, Inc. Holbrook hauls cattle to Seattle and other points on the West Coast.

A DIAMOND T with 190 hp Cummins diesel to Ivan Saunders, Merril, Ia., for hauling grain trailers from Sioux City Truck Sales, Inc.

CITY of Neosho, Mo., has purchased an Allis-Chalmers HD-6-G Tractor with a ripper from Chiles at Springfield.

FOURTEEN No. 922 West Coast Model Diamond T's with 220 hp Cummins diesels to Leased Trucks, Inc., Sioux City, Ia., for hauling meat to California, from Sioux City Truck Sales, Inc.

AN Allis-Chalmers HD-11-B Tractor to William Cantrell, Seymour, Mo., from Chiles Tractor & Machinery Co., Springfield, Mo.

Parts Sales Manager

John Cresto is appointed manager, parts sales, for the Engine-Material Handling Division, Allis-Chalmers Mfg. Company. He has been parts sales representative at the Milwaukee home office since 1956 and prior to that was in parts sales at the Harvey, Ill., Works. He is a native of Pittsburg, Kansas.

Cooper-Bessemer Chief Engineer

D. L. Gallogly

The elevation of D. L. Gallogly to the position of Chief Engineer at The Cooper-Bessemer Corporation has been announced by Ralph L. Boyer, Vice President and Director of Engineering. In his new capacity as Chief Engineer, Mr. Gallogly assumes responsibility for the supervision of all engineering divisions of The Cooper-Bessemer Corporation, under the immediate direction of Mr. Boyer. A graduate of Ohio State University in Mechanical Engineering, Mr. Gallogly entered the service of Cooper-Bessemer in 1929. For the past 29 years he has successfully held important positions within the company including the position of Service Manager, Chief Engineer of the Products Division and Assistant Executive Engineer. Reporting directly to Mr. Gallogly will be the chief engineers of the company's three engineering divisions, namely: T. O. Kuivinen, Chief Engineer Technical Division, R. F. Kymer, Chief Engineer Products Division and W. R. Crooks, Chief Engineer Development Div.

Elects Three To New Executive Positions

W. F. Burrows

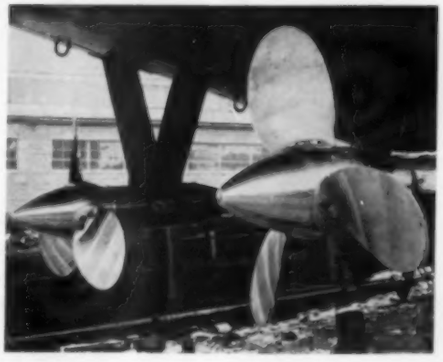
The White Motor Company board of directors elected three of its executives to new positions at its annual organization meeting recently, it was announced by Chairman Robert F. Black and President J. N. Bauman. In announcing the appointments, Mr. Black said: "Our company's divisional growth and diversification have led to the need for a broader management base. We are fortunate to have capable men in our organization to assume these broader responsibilities." Z. C. R. Hansen, president of the Diamond T Motor Truck Co., of Chicago, a wholly-owned White subsidiary, was elected a director of The White Company. He was

J. P. Dragin

Z. C. R. Hansen

also named Executive Vice President and General Manager of the Diamond T Division. This Division was acquired April 1. J. P. Dragin, vice president-finance, was named Executive Vice President —Finance and Administration. He is a director of the company. He has been with White since 1945 and vice president since 1956. William F. Burrows, general manager of the White Diesel Engine Division, Springfield, Ohio, was appointed Vice President and General Manager of the Diesel Engine Division. Mr. Burrows has been with White since 1949 and has been general manager of the Springfield operations of the company since the Division was acquired in 1956. All other officers of the company were re-elected by the board.

New Menhaden Boat Will Use Controllable Pitch Propellers



One of the first vessels of its kind to use controllable pitch propellers, a new menhaden boat is being built by J. F. Bellinger & Sons of Jacksonville, Florida for the Fish Meal Company. The vessel will be 150 ft-0 in. overall, twin screw, and will be powered by two Superior Diesels rated 325 bhp @ 830 rpm driving the propellers through Snow-Nabstedt reduction gears. Two 5 ft-6 in. diameter, 310 rpm, 3-bladed, stainless steel, Liaaen-Wegner controllable pitch propellers are to be used on the new vessel. A special design feature of the propeller installation is that the same propeller may be used at 500 shp @ 350 rpm should the horsepower of the vessel be increased at a future date. The Wegner controllable pitch propellers are particularly adaptable for menhaden service for creep speed control and greater maneuverability.

HERE IS IMPORTANT INFORMATION! The completely new 1958 edition of the **DIESEL ENGINE CATALOG,** Volume 23, is now available. If you design, purchase, sell, operate or service diesel, dual fuel or gas engines, the Catalog is essential to you. This giant, 400 page, 10½" x 13½", fully illustrated reference book has been revised, rewritten and brought up to date completely from cover to cover. Send your order in now for this limited edition, which costs $10 postpaid plus California sales tax where applicable. Send checks or company orders to **DIESEL ENGINE CATALOG,** 816 N. La Cienega Blvd., Los Angeles 46, Calif.

ADVERTISERS' INDEX

3 dependable products for the diesel industry

DE LAVAL IMO PUMPS

De Laval IMO pumps do a dependable job during long years of service. The reason is IMO design simplicity. De Laval IMO's have only three moving parts—smoothly intermeshing rotors that propel the fluid axially in a steady flow without churning, pocketing or pulsation. There are no reciprocating parts to wear or become noisy. Quiet, compact IMO pumps are excellent for direct-connected, high-speed operation. They can be furnished in capacities to 1,000 gpm and pressures to 1,500 psig.

DE LAVAL HYDRAULIC FAN DRIVES

De Laval Hydraulic Fan Drives for air cooled heat exchangers and cooling towers offer these important advantages. They *save* power since the fan operates at full speed only a portion of the time. They provide *accurate, automatic* control of engine jacket water temperature, and also assure complete operational flexibility. These units stay on the job for years. As shown, both IMO motor and speed reducer are mounted and factory aligned on a single bedplate.

DE LAVAL HIGH PRESSURE TURBOCHARGERS

De Laval turbochargers offer pressure ratios of 3:1 as well as higher compressor and turbine efficiencies than those found in conventional turbocharger systems. Output of heavy duty diesel, gas and dual-fuel engines may be doubled by De Laval turbochargers without increasing thermal loading. Exclusive Monorotor design offers a compact lightweight unit of sturdy construction. De Laval turbochargers are self-adjusting to engine loads, can be used on 4- *and* 2-cycle engines.

You'll find additional data in these De Laval Bulletins. Write for your copies.

DE LAVAL

Steam Turbine Company

TRENTON 2, NEW JERSEY

"past performance counts"

as more and more Cooper-Bessemer marine diesels are being re-ordered by satisfied users

Letters like this to our Vancouver agents prove Cooper-Bessemer diesels deliver the long life dependability that means lower costs and higher profits in marine service. *Make sure your files contain complete information. Write today.*

Vancouver Tug Boat Co., Ltd.

ESTABLISHED 1889

TUGS AND SCOWS

GENERAL TOWING CONTRACTORS

ALWAYS READY DIESEL TUGS

TELEPHONE: MARINE 4111

555 DENMAN STREET

VANCOUVER 5, CANADA

May 3, 1957.

Simson-Maxwell Ltd.,
1931 West Georgia Street,
Vancouver 5, B. C.

Attention: Mr. H. Maxwell

Gentlemen:

This company operates three vessels powered by Cooper-Bessemer diesel engines .... all engaged continuously in towing service on the British Columbia coast and southeastern Alaska.

The M/V "Sea Giant" is equipped with an eight-cylinder JS diesel, 13" bore and 16" stroke. This vessel has been in service since 1948 and has operated approximately 50,000 hours with only minor repairs.

Our experience with this engine prompted us to purchase two additional Cooper-Bessemer engines in 1955, one was installed in the M/V "La Garde" and the other in the M/V "Le Mars". These are six-cylinder JS engines, 13" bore by 16" stroke.

We have found these three engines economical in fuel consumption, and the repair costs compare most favorably with other diesel engines in our fleet.

Yours very truly,

VANCOUVER TUG BOAT COMPANY LIMITED,

C B Beaton

C. B. Beaton,
Port Engineer.

Cooper Bessemer

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ENGINES: GAS - DIESEL - GAS-DIESEL
COMPRESSORS: RECIPROCATING AND CENTRIFUGAL
ENGINE OR MOTOR DRIVEN